Research Paper :

Mode of action of the native potential antagonist, *Trichoderma fasciculatum* against *Colletotrichum gloeosporioides* causing mango anthracnose

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SUMMARY

For control of anthracnose of mango incited by *Colletotrichum gloeosporioides* Penz., native antagonistic microflora were used with different mechanisms. Under *in vitro* study, the four potential antagonists *viz.*, T_1, T_7, F_{11} and B_1 isolated from fructoplane showed the highest antagonistic activity in dual culture studies due to mycoparasitism and the efficacy of the four potential antagonists was confirmed in spread plate technique. Moreover, T_7 isolate was selected as the best fungicide compatible potential native antagonist among the fungicides evaluated in poison food technique. The effect of volatile and non-volatile metabolites produced by fructoplane isolate, *Trichoderma fasciculatum* (T_7) inhibited the mycelial growth and conidial germination over control on 3rd and 5th day of incubation, respectively through antibiosis. These findings indicated that the native potential antagonist T_7 which inhibited the growth of pathogen with different mechanisms combining with a compatible systemic fungicide Thiram at a lower concentration proved to be the best in integrated disease management of *Colletotrichum gloeosporioides*.

Key words : Mango, *Colletotrichum gloeosporioides*, Anthracnose, *T. fasciculatum* Mycoparasitism, Volatile and non-volatile compounds

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Mango (*Mangifera indica* L.) is considered as "king of fruits" grown throughout the tropics and subtropics worldwide. India is the world's largest producer of mango. *Colletotrichum gloeosporioides* causes anthracnose, which is the most important biological constraint to mango production in Southeast Asia resulting in 30-60% harvest losses (Dodd *et al.*, 1991). Though chemical control measures are effective, considering the cost of chemical pesticides and the environmental hazards involved, biological control is a viable strategy for sustainable disease management. The biologically active compounds from natural sources have always been of a great interest for scientists working on various diseases and understanding the mechanisms through which the biocontrol of plant diseases occurs is critical to the eventual improvement and wider use of biocontrol methods. The susceptibility of the pathogen to inhibitory metabolites of bioagents assumes greater relevance where the fungal pathogen is polyphasic, multicyclic and when all the different phases of life cycle of the pathogen are drastically affected by these antagonists. The present study dealts with the antagonistic effect of metabolites produced by the potential biocontrol agents against *Colletotrichum gloeosporioides*.

MATERIALS AND METHODS

Isolation, identification and pathogenicity:

The pathogen was isolated from infected mango fruits collected from mango orchards at Agricultural Research Station, Anantharajupeta, Kadapa (Dt), Andhra Pradesh by tissue segment method and purified by single spore isolation method (Rangaswami and Mahadevan, 1999). The isolates were identified by standard mycological keys (Barnett and Hunter, 1972) and maintained on Potato dextrose agar (PDA) for further studies. Wound inoculation method was used to test the pathogenicity on baneshan mango fruits (Bhuvanaeswari and Rao, 2001).

Screening of native potential bioagents by dual culture technique:

Serial dilution plate technique was used for the isolation of native antagonistic microflora from phylloplane and fructoplane of mango (Zenuchi, 2003). The antagonistic activity of microflora isolates against *C. gloeosporioides* was determined by dual culture technique under *in vitro* conditions (Bhuvaneswari and Rao, 2001).

Spread plate method:

1ml of conidial suspension of antagonistic fungi (10^4 conidia/ml) prepared using sterile