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Invitro Evaluation of Bioagents against Post harvest Diseases of Mango

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A B S T R A C T

The present investigation was to determine the antagonistic activity of bio-agents against postharvest diseases of mango. The agents *Trichoderma, Bacillus, Pseudomonas* and yeast isolates were individually screened against a number of postharvest pathogens including *Colletotrichum gloeosporoides, Alternaria alternata* and *Aspergillus niger.* The fungal antagonist *Trichoderma viride* was found the most effective in inhibiting the mycelial growth of pathogens by 60.84, 55.27 and 63.13 per cent respectively followed by *Trichoderma harzianum* 60.37 and 49.24, 52.04 per cent respectively.

Introduction

Mango (*Mangifera indica* L.) is an important fruit crop in the world. The world market continues to become more prices competitive in spite of postharvest challenges for example, losses caused by diseases (HCDA, 2011). Mango fruit suffers from many postharvest problems like diseases and disorders, which reduce the value of fruits during storage. In India, major postharvest diseases of mango are anthracnose (*Colletotrichum gloeosporioides*), *Alternaria* rot and black rot (*Aspergillus niger*), stem end rot which causes substantial losses to the fruit industry. Synthetic fungicides are primarily used for control of postharvest diseases of fruits and vegetables (Sharma *et al.*, 2009). However, the trend around the world is shifting towards reduced use of fungicides on produce and thus, there is a strong public and scientific interest in safer and eco-friendly alternatives to reduce the high loss due to decay loss of harvested commodities. Furthermore, the increasing concern for health hazards and environmental pollution due to chemical use has necessitated the development of alternative strategies for the control of postharvest diseases of fruits and vegetables.

Among the different biological approaches, use of the microbial antagonists like yeasts, fungi, and bacteria are quite promising and gaining popularity.

Materials and Methods

Isolation of pathogens associated with postharvest diseases of mango

The microorganisms responsible for spoilage of mango fruits were isolated on PDA medium by employing tissue isolation method from diseased mango fruits collected from rahuri market. The infected portion of fruit was cut into small pieces. These pieces were disinfected by surface sterilization with 0.1 percent mercuric chloride solution for 30 seconds followed by three washings with sterilized water in order to remove traces of corrosive sublimate. These small pieces of infected tissues were transferred aseptically to sterilized petriplates containing PDA medium (3 to 4 pieces/plates).These plates were then incubated at room temperature (27^{o}C) for seven days. The plates were critically observed for the typical growth of the fungus. The fungal colonies showing different colouration and sporulation were separated and sub-cultured in separate plates by single spore isolation method. The fungal colonies were then transferred on PDA slants for further investigation.

In vitro evaluation of antagonists against postharvest diseases of mango

Trichoderma viride, T. harzianum, P. fluorescens, B. subtilis and yeast starin-I, yeast starin-II, were tested for their efficacy against postharvest diseases by the dual-culture technique (Dennis and Webster, 1971) in PDA. Three replications were done with each antagonist. 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 bio-control agent. The per cent 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

Effect of bio-control agents against mycelial growth of postharvest pathogens of mango

The results presented in the Table 1,among all the treatments, fungal antagonist *Trichoderma viride* was found the most effective in inhibiting the mycelial growth of *Colletotrichum gloeosporoides, Alternaria alternata* and *Aspergillus niger* by 60.84 %, 55.27 and 63.13 per cent respectively followed by *Trichoderma harzianum* 60.37 and 49.24, 52.04 per cent respectively. Whereas least inhibition was exhibited in yeast strain-II (20.75, 28.64 and 14.17% Inhibition).

Similar observations were made by Bhuvaneshwari and Rao (2001) who reported that *T. viride* inhibited the growth of *C. gloeosporioides, Alternaria altarnata* and *Aspergillu sniger* which were pathogens of the post harvest diseases of mango.

Table.1 Efficacy of biological agents on postharvest pathogens of mango *in vitro*

Treatments	*Colletotrichum gloeosporoides*		*Alternaria alternata*		*Aspergillus niger*	
	Radialgrowth of pathogen (mm)	Inhibition over Control (%)	Radial growth of Pathogen (mm)	Inhibition over Control (%)	Radial growth of pathogen (mm)	Inhibition over Control (%)
Trichodermaviride	27.67	60.84	29.67	55.27	30.50	63.13
Trichodermaharzianum	28.00	60.37	33.67	49.24	39.67	52.04
Bacillus subtilis	43.67	38.28	39.33	40.70	60.67	26.66
Pseudomonas fluorescens	47.67	32.55	42.33	36.18	63.33	23.44
Yeaststrain-I	36.67	48.11	35.33	46.73	51.07	38.26
Yeast strain-II	56.00	20.75	47.33	28.64	71.00	14.17
Control	70.67	00.00	66.33	00.00	82.73	00.00
S.E.(±)	1.33		0.66		0.675	
C.D @ 5 %	3.99		1.98		2.048	

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