

ISOLATION OF FUNGAL PATHOGENS FROM INFESTED BANANA FRUITS AND ITS CONTROL USING *TRICHODERMA*

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ABSTRACT: Banana (*Musa paradisiaca* L) is very popular commercial crop in India and widely cultivated in tropical and subtropical part of the country. Being popular commercial crop the various pathogens are attacking on it. These pathogens were isolated and identified from banana viz. *Fusarium oxysporum*, *Aspergillus niger*, *Aspergillus flavus*, *Aspergillus nidulans*, *Rhizopus stolonifer*, *Cladosporium cladosporidae*, *Colletotrichum musae* and *Penicillium expansum*. Banana pathogens cause vital losses up to 30% thus; the most aggressive chemical compounds have been used to control the banana diseases. The use of chemical compounds is hazardous to crops as well as human health. This problem is solved using biocontrol agents. There are various micro-organisms used as antagonistic to banana pathogens. Plant pathogens are risk free when it results in enhancement of resident antagonist. Biological control of banana pathogens appears as an attractive and realistic approach using *Trichoderma harzianum* and *T. viride*. *T. harzianum* and *T. viride* were isolated from pneumatophore of mangrove plant (*Avicennia*) soil and identified. *Trichoderma* was used as a biological control agent by dual culture method against pathogens of banana. Presently investigated that eight banana pathogens were inhibitory using *Trichoderma*. It was observed that *Trichoderma* inhibited the growth of *Aspergillus nidulans* (66.67%) very fruitful and followed by *Colletotrichum musae*, *Cladosporium cladosporidae*, *Fusarium oxysporum*, *Aspergillus niger*, *Aspergillus flavus*, *Rhizopus stolonifer*, *Penicillium expansum*.

Keywords : Biocontrol, *Trichoderma harzianum*, Banana fruit.

INTRODUCTION:

Eight fungal pathogens were isolated and identified viz. *Fusarium oxysporum*, *Aspergillus niger*, *Aspergillus flavus*, *Aspergillus nidulans*, *Rhizopus stolonifer*, *Cladosporium cladosporidae*, *Colletotrichum musae* and *Penicillium expansum* from infested banana. The use of chemicals and fungicides for controlling the pathogens leads to severe environmental pollution and also the populations of beneficial microbes are reduced. The *Trichoderma harzianum* and *T.viride* have unique ability to control various plant pathogens. The present investigation was undertaken to find out eco-friendly management of banana pathogens using *Trichoderma* spp. (Gangawane 1981; Janisiewicz and Korsten, 2002; Suryawanshi, 2005; Anupama *et al.* 2007 and Patale and Mukadam, 2011)

MATERIALS AND METHODS :

Antagonistic potential of *Trichoderma* against banana pathogens. *Trichoderma harzianum* and *T. viride* were isolated from the pneumatophore of mangrove plant (*Avicennia*) soil and identified. Similarly pathogenic fungi viz. *Fusarium oxysporum*, *Aspergillus niger*, *Aspergillus flavus*, *Aspergillus nidulans*, *Rhizopus stolonifer*, *Cladosporium cladosporidae*, *Colletotrichum musae* and *Penicillium expansum* was isolated from naturally infected banana fruits. Isolated fungal strains was maintained on potato dextrose agar (PDA) medium and used for further study. Antagonistic activity of *Trichoderma* spp. over pathogenic fungi was tested by employing dual culture technique (Dennis and Webster, 1971, Rajkonda *et al.*, 2011). Twenty ml of sterilized melted PDA was poured in sterilized petriplates, allowed to solidify and *Trichoderma* spp. from fresh 7 day old culture was inoculated with test fungi about 6 cm away from each other and incubated at $28 \pm 1^\circ\text{C}$. Three replications were maintained for each treatment. An observation of the antagonistic activities of *Trichoderma* was recorded after 7 days when the growth of

pathogenic fungi became static the inhibition over control was calculated (Dennis and Webster, 1971, Singh P.K. and Vijay Kumar, 2011).

RESULTS AND DISCUSSIONS:

Two species of *Trichoderma* was tested for their antagonistic against *Aspergillus nidulans*, *Colletotrichum musae*, *Cladosporium cladosporidae*, *Fusarium oxysporum*, *Aspergillus niger*, *A. flavus*, *Rhizopus stolonifer* and *Penicillium expansum*. The result summarized in the Table 1 and fig.1 showed that eight pathogenic fungi on banana were found inhibitory. It was observed that *Trichoderma* inhibited the growth of *Aspergillus nidulans* (66.67%) very fruitful and followed by *Colletotrichum musae*, *Cladosporium cladosporidae*, *Fusarium oxysporum*, *Aspergillus niger*, *Aspergillus flavus*, *Rhizopus stolonifer*, *Penicillium expansum*. The similar results has been observed by earlier workers Janisiewicz and Korsten (2002), Agarry *et al.*, 2005, Anupama *et al.*, 2007, Patale and Mukadam (2011) and Dahiwalé and Suryawanshi (2012) reported that *Trichoderma harzianum* shows stronger antagonistic as compared to *T.viride* for controlling the fungal pathogens.

Table 1: Antagonistic effect of *Trichoderma* spp. against pathogenic fungi on banana fruit (after 7 days)

Sr. No.	Plant Pathogenic fungi on Banana fruit	Control(without <i>Trichoderma</i> spp.) individual (in mm)	Inhibition due to			
			<i>T. harzianum</i> (in mm)	%	<i>T. viride</i> (in mm)	%
1.	<i>Aspergillus nidulans</i>	72	24	66.66	27.80	61.29
2.	<i>Colletotrichum musae</i>	70	30	57.14	33.60	52.00
3.	<i>Cladosporium cladosporidae</i>	72	31	56.93	34.60	51.93
4.	<i>Fusarium oxysporum</i>	61	27	55.73	32.80	46.16
5.	<i>Aspergillus niger</i>	90	48.5	46.03	59.30	34.03
6.	<i>Aspergillus flavus</i>	90	52.3	41.86	57.70	35.86
7.	<i>Rhizopus stolonifer</i>	90	55	38.88	61.00	32.12
8.	<i>Penicillium expansum</i>	61	41.6	31.70	47.11	22.67

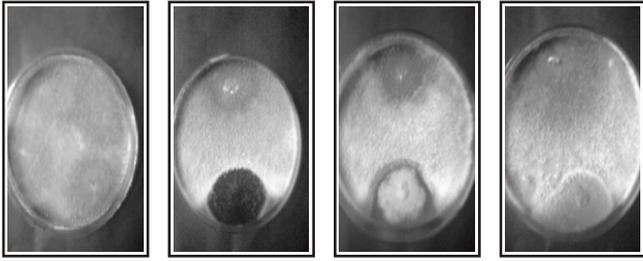


Fig1. Antagonistic effect between *Trichoderma harzianum* and *Aspergillus niger*, *Fusarium oxysporum*, *Penicillium expansum*

CONCLUSION:

Use of *Trichoderma spp* as a biocontrol agent against banana pathogens, Use of fungicide in excess cause environmental pollution and reduce beneficial microbes, The antagonistic effect of *Trichoderma harzianum* and *T.viride* against pathogenic fungi, *Trichoderma spp* isolated from mangrove plant soil.

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