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Fungal antagonists of some plant pathogens

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Fungi antagonistic to different crop pathogens (six), *Alternaria brassicicola Alternaria triticina, Curvularia lunata, Curvularia pallescens, Fusarium oxysporum f. sp. udum* and *Fusarium moniliforme* were isolated different sources. Four selected fungi *Trichoderma harzianum, Tricholoma crassum, Myrothecium roridum* and *Aspergillus niger* were evaluated against six crop pathogens under laboratory conditions. Among them *Trichoderma harzianum* and *Aspergillus niger* were highly antagonistic to *Fusarium* spp. and *Myrothecium roridum* and *Tricholoma crassum* showed its highest antifungal activity against *Curvularia* spp.

Key words : Antagonists *Trichoderma harzianum, Aspergillus niger, Myrothecium roridum, Tricholoma crassum,* biocontrol, *Alternaria brassicicola, A. triticina, Curvularia lunata, C. pallescens, Fusarium oxysporum* f. sp. *udum, F. moniliforme*

INTRODUCTION

The study of antagonistic properties of fungi has been gained tremendous importance and has been used in biological control of several crop pathogens. The potentiality of some fungi to produce antifungal, antibacterial, even antivirul drugs has been reported. The nature of antagonism (antibiosis, lysis, parasitism, predation and competitition) differ from antagonist to antagonist and antagonists act on pathogens either one or a combination of more listed above.

Ghisalberti and Sivasisthamparm (1991), Brask (1991) reported the ability of *Trichoderma* spp. to produce antibiotics (Trichodorin, Gliotoxin, Viridine etc.) and discussed the possible ecological relevance of these antibiotics. Avent *et al.,* (1992) reported the biosynthesis of harzianolide (an antifungal metabolite) by *T. harzianum.* Turhan and Grossmann (1994) reported the antagonistic activity of 69 *Myrothecium* isolates belonging to 5 species against 6 soil borne plant pathogenic fungi by streak method. Torres *et al.,* (1998) reported the bactericidal and fungicidal activities of aspyrone and asperlactone, secondary metabolites of *Aspergillus ochraceus.*

In this programme attempt has been empolyed to find out antagonistic properties of soil borne fungi viz. *Trichoderma* sp., *Tricholoma crassum, Myrothecium roridium* and *Aspergillus niger* against several crop pathogens following dual culture plate technique (Morton and Stroube 1955; Dubey and Patel, 2001).

MATERIALS AND METHODS

Fungal antagonists were evaluated *in vitro* against 6 fungal pathogens by dual culture technique in PDA medium. Disc of the antagonist as well as pathogen were cut with the help of sterilized cork borer from the edges of 7 days old culture and then placed apart on the soildified PDA medium. Plates were incubated (26 ± 2°C). In case of *M. roridum* and *T. crassum*, the antagonists were inoculated before the inoculation of pathogens because growth rate of such two fungal antagonists were much slower than that of pathogens selected. For equalization of growth rate of both antagonist and pathogen, antagonists were inoculated earlier. Inhibition of mycelial growth and sclerotial formation of pathogens by each antagonist were recorded on the basis of radial growth in dual culture and in control (only pathogen) with the help of following

formula :

$$I = (C(-T)/C*100$$

Where, I + percent inhibition

C = radial growth/sclerotia in control

T = radial growth/sclerotia in the treatment

RESULTS AND DISCUSSION

Among vaious types of antagonists used, *Trichoderma harzianum* is highly antagonistic against *Fusarium spp.* and restrict the growth of pathogen significantly ; whereas *Myrothecium roridum* showed its highest degree of antimicrobial property against *Curvularia* spp. (Fig. 2) and *Alterneria* sp. ; Whereas *Tricholoma crassum* showed its highest antimicrobial nature against *Curvularia* spp. and less effective against *Alternaria brassicicola* and *Fusarium* spp. Therefore these four fungal antagonists evaluated can be selected for further experimental studies *in vivo.*

Fig. 1 : Antibiosis between *Myrothecium roridum* (right) and *Curvularia pallescens* (left). *M. roridum* produces antibiotic (s) which inhibit the growth of *C. pallescens,* resulting a zone of inhibition with little growth where the fungi meet.

Fig. 2 : Interaction between *Curvularia lunata* (fight) and *Aspergillus niger* (left) showing mild antagonistic effect.

Table 1 : Inhibition of mycelial growth of different fungal pathogens by different fungal antagonists.

Fungal antagonists	Fungal pathogens	Radial growth in control (mm)	Radial growth in the treatment (mm)	Percent inhibition (*)
		After four days		
Trichoderma harzianum	*Altereria brassicicola*	8	5	37.5
	A. triticina	20	15	25
	Curvularia lunata	30	20	33.3
	C. pallescens	25	15	40
	F. oxysporum f.sp. *udum*	20	10	50
	F. moniliforme	20	10	50
Aspergillus niger	*A. brassicicola*	8	6	2
	A. triticina	20	17	15
	Curvularia lunata	30	25	16.67
	C. pallescens	25	20	20
	F. oxysporum f.sp. *udum*	20	13	35
	F. moniliforme	20	12	40
Myrothecium roridum	*A. brassicicola*	12	10	16.67
	A. triticina	30	23	23,33
	Curvularia lunata	40	20	50
	C. pallescens	40	20	50
	F. oxysporum f.sp. *udum*	30	20	33.33
	F. moniliforme	30	20	33.33
Tricholoma crassum	*A. brassicicola*	12	11	8.3
	A. triticina	30	25	16.67
	Curvularia lunata	40	30	25
	C. pallescens	40	32	20
	F. oxysporum f.sp. *udum*	30	26	13.33
	F. moniliforme	30	27	10

* Average of two replicates.

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