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EFFECT OF SOME CHEMICAL AND SOME BIOLOGICAL SOURCES ON THE ANTAGONISTIC ACTION BETWEEN SOME SOIL-BORNE FUNGI

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ABSTRACT

Effect of some chemicals (Pesticides) using various concentrations and some biological sources on radial growth of some soil- borne fungi (Pathogenic fungi) with two antagonistic fungi was studied The trail was done in vitro by growing infested agar discs on PDA containing various concentrations of the chemical pesticides, i.e. fungicide, herbicide, nematicide and insecticide. The biological sources were antibiotics, and plant originated oils. The effects of three concentrations of each group were tested against six soil-borne fungal pathogens. The data obtained gave some attractive results, the fungicide vitavax 300and herbicide afalon showed strong inhibitory effect on all pathogenic and antagonistic fungi in the three concentrations. The effects of the tested nematicide and insecticide were low when compared with the effect of the tested fungicide in the same trail, the lowest effect of the medium dose was obtained from Vydate on *Verticillium albatrum* with *Trichoderma harzianum*, the growth reduction percentages were (5.7-0.0); while the highest effect was obtained from Vydate on *Pythium debaryanum* with *T.Legnorum* (37.5-16.0). The medium dose of hostathion (insecticide) gave low inhibitory effect against *Verticilliun alboatrum* with T.Legnorum (6.7-0.0), while the highest effect was obtained from hostathion on *Rhizoctionia solani* with *T.harzianum* (40-20).The canestien gave very serious fungicidal effect against all treated soil- borne fungi with two antagonistic fungi, it was noticed that the reduction percentages using medium dose ranging between (75.0-92.0) was in the case of *Pythium debaryanum* and (88.9-92.6) in the case of R-solani with *T.Legnorum* ,(73.3-91.10) in the case *Pythium debaryanum* and (88.6-92.9) in the case R.solani with *T.harzianum*.The tested antibiotic the chlorotetracyclin gave low inhibitory effect when compared with canestien. The plant originated oils treatments gave low and moderate effect in general, the highest effect was obtained from the garlic oil at low medium and high dose giving(61.5-42.0),(64.1-44.0) and (69.2-48.0) reduction in the radial growth percentages of *R.solani* with *T.Legnorum*, while the best results were obtained from mustard oil treatment giving reduction percentages of (37.5-10.0),(50.0-20)and(50.0-20.0)respectively with *P-debaryanum* with *T-legnorum*.
Keywords: fungicide, herbicide, insecticide - Nematicide , plant originated oils, Trichoderma – soil borne fungi

INTRODUCTION

The main diseases of seeds and seedlings are seed rotting, pre- and post- emergence damping off and various seedling blights. This complex of diseases is mostly caused by a few fungal especially *Rhizoctonia , Pythium , Fusarium*, *Verticillium* and *Sclerotinia*. Seed rots and damping off remains a real problem. There are cheap, effective chemical means of control, by applying fungicides to the seed coat as a dust. *Trichoderma* spp. has been used against seed rotting and damping off caused by such fungi,. A major objection on many of the chemical control currently in use is in their

indiscriminate effect on organism other than the pathogen. Rather than to kill the pathogen, it may only be necessary to weaken it and it more vulnerable to antagonism of the associated microflora (Baker and Cook, 1974). Kay and Stewart (1994) evaluated the sensistivity of four antagonists (*chaetomium globosum*), *Trichoderma harzianum, T-viride and Trichoderma sp*)to six fungicides, the fungi were sensitive to benomyl and the two dicrobximides. Figueras-Roca et al (1996) studied the sensitivity of the nine isolates belong to *five Trichoderma* species. The experimental results showed highly significant differences among both isolates and fungicides, the fungicides: flutrialfol, fenarimol, and myclobutanil were the least effictive in inhibiting growth of *Trichoderna* isolates, while Abd-El-Moity et al (1982) reported that after prolonged and repeated exposure of *T. harzianum* isolates T. 14, Wt-6 and Th. 1 (Egyptian isolate) to benomyl 0.5 – 10 Mg a-i 1 ml no tolerance of these isolates was observed.They pointed that continiuos expousre of wide strain of *T. harzianum* to fungicides resulted in some morphological changes in colony characters, e.g. pattern of sporulation, sporadical sporulation on the agar, and changes in spore colour. Abd-El-Mallek et al (1994) found that the two herbicides alachlor and haloxyfop each at 100, 500 and 1000 mg/L reduced the radial growth of some fungi including *T. harzianum*, while Ahmed et al (1995) studied the influnce of bioherbicides “phosphothricin” on interactions between phytopathogens and their antagonists. They found that such herbicide is inhibitory to antagonistic soil microorganisms including *Bacillus subtilis pseudomonas fluorescns* and many species of *Trichoderma*, they also mentioned that, in pathogen-antagonist challenges, species of *Trichoderma* that parasitie *F. oxysporum and pythiuem aphanidermatum* were eliminated when phosphinothricin was added to the growth media.
Zahavi et al (1986) found that saponin A and its debenzoylated derivative, saponin B, extracted from *styrax officinalis*, L. inhibited mycelial of *T. viride*, in-virtro. While lalithaT. and venkataranan,L. (1991) found that saponins isolated from the defatted flour of madhuca butyracea seeds caused maximum growth inhibition of trichoderma viride (LD5<500 ppm)

Pandey and Dubey (1994) found that essential oil of the plants *Hyptis suaveolens*, *Murraya koenigii* and *Ocimum camum* could control damping- off disease of *tomato* up to 83, 67 and 50 v. respectively.

In addition, Wilson *et al* (1997) in USA used assay to determine antifungal activity in plant extracts and essential oils. They found that some plant extracts showed high levels of antifungal activity against *Botrytis cinerea.* According to essential oils, the assay demonstrated that plamarosa (*Cymbopogon martini*), redthyme (*Thymus zygis*), cinnamon leaf (*Cinnomomum zeylanicum*) and clove buds (*Eugenia caryophyllata*) had most antifungal activity against some soil-borne fungi.

MATERIALS AND METHODS

The causal organism:

Diseased cucumber, cowpea and squash seedlings were collected from seedlings grown at the farm of Fac. of Agric. Mansoura Univ. Fungi

were isolated on Potato Dextrose Agar (PDA) and incubated on 28^0 C for 7 days. Isolated fungi were purified and identified according to Barnett and Hunter (1972). Pure cultures of *Fusarium oxysporum f.sp lycopersici, Trichoderma harzianum* and *T. lognorum* were kindy received *from* Institute of Plant Pathology ,A.R.C., Cairo.

Chemical and Biological Sources:

Various selected chemical and biological sources were tested through consecutive experiment; i.e., in vitro (Lap exp.).

The used chemicals were mainly soluble pesticide materials; i.e., fungicide, herbicide, insecticide and nematicide see table (1), on the other hand, the used biological sources were antibiotics and plant originated oils were dissolved in acetone before preparing their water solutions.

Laboratory Experiments:

For studying the effect of the different selected materials on the rate of antagonism between two isolates of *Trichoderma spp.* and six isolates of pathogenic fungi on PDA medium.

The medium was supplemented with certain concentration of each tested material. The material with medium was incubated with PDA culture discs (4mm diam) of both antagonistic fungi of fungal pathogen (two discs total / dish). The discs were placed opposite each other. Medium inoculated either fungal pathogen or antagonistic fungus as a control. All plates were incubated on 20-25^0 C for up to 7 days. On the other hand, the used method was as described by Johnson et al (1959).

The linear growth of all pathogenic and antagonistic fungi, at all treatments were recorded after the incubation period and the means or reduction percentages were calculated.

RESULTS AND DISCUSSION

Laboratory investigations:

Effect of some agrochemical (pesticides) using various concentrations on the radial growth of some soil –borne pathogenic fungi with two antagonistic fungi:-

The trail was done in-vitro by growing the infested agar discs on surface of PDA medium containing the various concentrations of the tested chemical pesticides groups, i.e. fungicide, herbicide, nematicide and insecticide. The effects of three concentrations of each group of pesticides consisting each group were tested against six soil-borne fungal pathogens. The data obtained gave some attractive results that could be summarized as following: -

1st) Fungicides: The vitavax 300 showed strong inhibition effect on all the tested pathogens (*R . solani, P . debaryanum , F . oxysporum f . sp. lycopersici*, *F . solani, Verticillium albo-atrum* and *S. sclerotiorum*). The tested doses of

vitavax 300 were 2000, 3000and 4000 p.p.m doses of the reduction in radial growth percentage of it reached (90.0-92.0), (89.7-92.0), (88.9-92.6), (87.5-93.1), (88.7-92.6) and (86.7-92.7) with *P. debaryanum*, *R. solani, S. sclerotiorum, F. oxysporum f. sp. lycopersici, F. solani* and *V. albo-atrum* respectively with *T. legnorum.* On the other hand, all fungi with *T. harzianun* gave (91.1-91.1), (88.6-92.9), (88.6-92.7), (87.9-92.9), (86.7-93.3) and (86.7-93.3) reduction percentages respectively with *P. debaryanum, F. solani, V. albo-atrum, S. sclerotiorum, R. solani and F. oxysporum f. sp. Lycopersici* reduction percentage respectively.

Table (1): Effect of some chemicals on the antagonism between *Verticillium albo-atrum* and two antagonistic fungi

Mean and percentages of inhibition in m.m.									
Name and conc./ Ppm		***Verticillium albo-atrum***		***T. legnorun***		***V.alboatrum***		***T. harzianun***	
		RG	**Rd**	**RG**	**Rd**	**RG**	**Rd**	**RG**	**Rd**
Control		30	00.0	55	00.0	35	00.0	55	00.0
Vitavax	2000	04	86.7	04	92.7	04	88.6	04	92.7
V	3000	04	86.7	04	92.7	04	88.6	04	92.7
V	4000	04	86.7	04	92.7	04	88.6	04	92.7
Afalon	1500	04	86.7	04	92.7	04	88.6	04	92.7
A	2500	04	86.7	04	92.7	04	88.6	04	92.7
A	3500	04	86.7	04	92.7	04	88.6	04	92.7
Vydate	3000	30	00.0	56	-01.8	35	00.0	55	00.0
V	4000	28	06.7	56	-01.8	33	05.7	55	00.0
V	5000	28	06.7	58	-05.5	32	08,6	55	00.0
Hostathion	3000	28	06.7	55	00.0	30	14.3	60	-09.1
H	4000	28	06.7	55	00.0	30	14.3	60	-09.1
H	5000	27	10.0	55	00.0	30	14.3	60	-09.1
L S D 5%		**1.07**		**1.9**		**1.01**		**0.74**	

RG = Radial growth
RD = Reduction percentage

Table (2): Effect of some chemicals on the antagonism between *Fusarium solani* and two antagonistic fungi

Mean and percentages of inhibition in m.m.									
Name and conc. Ppm		***F. solani***		***T. legnorum***		***F. solani***		***T. harzianum***	
		RG	**Rd**	**RG**	**Rd**	**RG**	**Rd**	**RG**	**Rd**
Control		36	00.0	54	00.0	35	00.0	56	00.0
Vitavax	2000	04	88.9	04	92.6	04	88.6	04	92.9
V	3000	04	88.9	04	92.6	04	88.6	04	92.9
V	4000	04	88.9	04	92.6	04	88.6	04	92.9
Afalon	1500	04	88.9	04	92.6	04	88.6	04	92.9
A	2500	04	88.9	04	92.6	04	88.6	04	92.9
A	3500	04	88.9	04	92.6	04	88.6	04	92.9
Vydate	3000	30	16.7	60	-11.11	30	14.2	60	07.1
V	4000	28	22.2	60	-11.11	30	14.3	60	-07.1
V	5000	28	22.2	62	-14.8	30	14.3	60	-07.1
Hostathion	3000	30	16.7	60	-11.11	30	14.3	65	-16.1
H	4000	30	16.7	60	-11.11	30	14.3	65	-16.1
H	5000	30	16.7	60	-11.11	28	20.0	66	-17.9

LSD 5%	**1.6**	**1.55**	**2.35**	**3.35**

RG = Radial growth
RD = Reduction percentage

Table (3): Effect of some chemicals on the antagonism between *Rhizoctonia solani* and two antagonistic fungi

Mean and percentages of inhibition in m.m.								
Name and conc./ Ppm		***R. solani***		***T. legnorum***		***R. solani***		***T. harzianum***	
		RG	**Rd**	**RG**	**Rd**	**RG**	**Rd**	**RG**	**Rd**
Control		39	00.0	50	00.0	30	00.0	60	00.0
Vitavax	2000	04	89.7	04	92.0	04	86.7	04	93.3
V	3000	04	89.7	04	92.0	04	86.7	04	93.3
V	4000	04	89.7	04	92.0	04	86.7	04	93.3
Afalon	1500	04	89.7	04	92.0	04	86.7	04	93.3
A	2500	04	89.7	04	92.0	04	86.7	04	93.3
A	3500	04	89.7	04	92.0	04	86.7	04	93.3
Vydate	3000	30	10.2	55	10.0	30	00.0	60	00.0
V	4000	25	23.1	55	-10.0	28	06.7	62	03.0
V	5000	35	35.9	60	-20.0	28	06.7	63	-05.0
Hostathion	3000	28	28.2	50	00.0	20	33.3	70	-16.6
H	4000	25	35.9	55	-10.0	18	40.0	72	-20.0
H	5000	20	48.7	62	-24.0	15	50.0	75	-25.0
LSD 5%		**4.45**		**4.9**		**1.59**		**2.87**	

RG = Radial growth
RD = Reduction percentage

Abd-El-Moity et al (1982) reported that, T. harzianun was sensitive to bnomyl at 0.5-10 □g/ml doses after prolonged and repeated exposure, also they pointed out that, continuos exposure of wild strain of T. harzianum to fungicides resulted in some morphological changes in colony characters e.g. pattern of sporulation, sporadical sporulation on the agar and changes in spore colour. While Figueras-Roca et al (1996) found that some fungicides gave highly significant reduction to five Trichodrma species, while flutriafol, fenarinol and myclobutanil were the last effective in inhibiting growth of Trichoderma spp. isolates.

(Kay and Stewart, 1994) evaluated the sensitivity of four antagonists (*Chactomium globosum, Trichoderma harzianum, T.viride* and *Trichoderma sp*.) to six fungicides. The fungi were sensitive to benomyl and two dicarboximide improdione and prosymidone.

C: Nematicide: - In general examination of all treatments, showed that the effect of the tested nematicide was very low when compared with the effect of the tested fungicide in the trail, the lowest effect of the medium dose was obtained from *vydate* on V. alboatrum with *T.harzianum*, the growth reduction percentages were (0.0-9.1) and (5.7-0.0) respectively. While the highest effect was obtained from vydate on *P. debaryanum* with *T.legnorum* (37.5-16.0) at the medium dose.

D- Insecticide: - The insecticide gave low and moderate effect against all tested fungi in general, the medium dose of hostathion gave low inhibitory effect against V.albo-atrum with T. legnorum (6.7-0.0), while the highest effect was obtained from *Hostathion* on P,*debaryanum* with *T. Harzianum* (37.8-37.8). Generally , the effect of the chemical components on

all tested soil bore fungi with antagonistic fungi differ from one to other according to the type and to the dose.

Ahmed *et al* (1995) studied influence of the bioherbicides phosphinothricin on interactions between phytopathogens and their antagonists. They found that such herbicides is inhibitory to antagonistic soil microorganisms including many species of *Trichoderma*, They also maintained that in pathogen - antagonist challenges, species *Trichoderma* that parasites *F. oxysporum* and *Pythium aphanidermatum* were eliminated when herbicides was added to the growth media. Abd-El-Maliak *et al* (1994) found that the two herbicides alachlor and haloxylfop each at 100, 500 and 1000 mg/ L reduced the radial growth of some fungi including *T.harzianum.* While Abd-El-Mallak et al (1994) found that, the two herbicides alachor and heloxyfop at 100, 500 and 1000 mg/L reduced thr radial growth of some fungi including *T. Harzianun.*

Table (4): Effect of some chemicals on the antagonism between *Sclerotinia sclerotiorum* and two antagonistic fungi

Mean and percentages of inhibition in m.m.									
Name and conc./ ppm		***S. sclerotiorum***		***T. legnorum***		***S. sclerotiorum***		***T. harzianum***	
		RG	**Rd**	**RG**	**Rd**	**RG**	**Rd**	**RG**	**Rd**
Control		35	00.0	52	00.0	33	00.0	57	00.0
Vitavax	2000	04	88.6	04	92.6	04	87.9	04	92.9
V	3000	04	88.6	04	92.6	04	88.6	04	92.9
V	4000	04	88.6	04	92.6	04	88.6	0	92.9
Afalon	1500	04	88.6	04	92.6	04	88.6	04	92.9
A	2500	04	88.6	04	92.6	04	88.6	04	92.9
A	3500	04	88.6	04	92.6	04	88.6	04	92.9
Vydate	3000	30	14.3	56	-7.7	30	10.0	60	-5.3
V	4000	28	20.0	57	-9.7	28	15.2	62	-8.8
V	5000	28	20.0	60	-15.4	27	18.2	63	-10.5
Hostathion	3000	30	14.3	58	-11.5	28	15.2	62	-8.8
H	4000	28	20.0	62	-19.2	28	15.2	62	-8.8
H	5000	25	28.6	65	-25.0	25	24.2	64	-12.3
LSD 5%		**3.9**		**2.8**		**3.2**		**2.9**	

RG = Radial growth
RD = Reduction percentage

Table (5): Effect of some chemicals on the antagonism between *Pythium debaryanum* and two antagonistic fungi

Mean and percentages of inhibition in m.m.									
Name and conc./ ppm		***P. debaryanum***		***T. legnorum***		***P. debaryanum***		**T. harzianum**	
		RG	**Rd**	**RG**	**Rd**	**RG**	**Rd**	**RG**	**Rd**
Control		40	--	50.0	---	454	--	45	--
Vitavax	2000	4.0	90	4.0	92.0	4.0	91.1	4.0	91.1
V	3000	4.0	90	4.0	92.0	4.0	91.1	4.0	91.1
V	4000	4.0	90	4.0	92.0	4.0	91.1	4.0	91.1
Afalon	1500	4.0	90	4.0	92.0	4.0	91.1	4.0	91.1
A	2500	4.0	90	4.0	92.0	4.0	91.1	4.0	91.1
A	3500	4.0	90	4.0	92.0	4.0	91.1	4.0	91.1
Vydate	3000	25.0	37.5	55.0	-10.0	30.0	33.3	58.0	-28.9
V	4000	25.0	37.5	58.0	-16.0	30.0	33.3	60.0	-33.3
V	5000	25.0	37.5	60.0	-20.0	29.0	35.6	60.0	-33.3
Hostathion	3000	30.0	25.0	60.0	-20.0	29.0	35.6	61.0	-35.6
H	4000	30.0	25.0	60.0	-20.0	28.0	37.8	62.0	-37.8
H	5000	30.0	25.0	60.0	-20.0	27.0	40.0	62.0	-37.8

LSD 5% **1.8** **1.63** **1.69** **2.22**
RG = Radial growth
RD = Reduction percentage

Table (6): Effect of some chemicals on the antagonism between *Fusarium oxy. Lyco* and two antagonistic fungi

Name and conc./ ppm		Mean and percentages of inhibition in m.m.							
		F. oxysporum Lycopersici		*T. legnorum*		*F. oxysporum Lycopersici*		*T. harzianum*	
		RG	Rd	RG	Rd	RG	Rd	RG	Rd
Control		32	--	58.0	--	30.0	--	60.0	--
Vitavax	2000	4.0	87.5	4.0	93.1	4.0	86.7	4.0	93.3
V	3000	4.0	87.5	4.0	93.1	4.0	86.7	4.0	93.3
V	4000	4.0	87.5	4.0	93.1	4.0	86.7	4.0	93.3
Afalon	1500	4.0	87.5	4.0	93.1	4.0	86.7	4.0	93.3
A	2500	4.0	87.5	4.0	93.1	4.0	86.7	4.0	93.3
A	3500	4.0	87.5	4.0	93.1	4.0	86.7	4.0	93.3
Vydate	3000	30.0	06.7	59.0	-17.0	26.0	13.3	62.0	-03.3
V	4000	29.0	09.4	60.0	-03.4	26.0	13.3	63.0	-05.0
V	5000	26.0	18.8	62.0	-06.9	24.0	20.0	65.0	-08.3
Hostathion	3000	29.0	09.4	60.0	-03.4	26.0	13.3	64.0	-06.7
H	4000	28.0	12.5	63.0	-08.6	25.0	16.7	65.0	-08.3
H	5000	25.0	21.9	65.0	-12.1	23.0	23.3	65.0.	-08.3
LSD 5%		**2.44**		**3.44**		**1.7**		**4.7**	

RG = Radial growth
RD = Reduction percentage

2: Biological Sources Effect

The effect of certain biological materials using various concentrations on the radial growth of antagonism between some soil borne fungi with two antagonistic fungi.

Results obtained from these trails are shown in tables (7-12) no high reductive effects belonging to the investigated sources were noticed in all cases except in treatments with antibiotics, canestien and garlic oil against the radial growth of the six investigated soil-borne fungi and two antagonistic fungi.

1st) Antibiotics: - The canestien gave very serious fungicidal effect against all treated soil borne fungi with the two antagonistic fungi, it was noticed that the reduction percentages of canestien using medium dose on the pathogenic fungi with antagonistic fungi ranging from (75.0- 92.0) in the case of *pythium dabaryanum* and (88.9-92.6) in the case of *F.solani* with *T. legnorum*. The high concentration of canestien gave (73.3-91.1) in the case of *P. debaryanum* and (88.6-92.2) in the case of *F.solani* with *T. harzianum* percentage reduction in the radial growth.

The other tested antibiotic the chlortetracycline could not compete with the canestien in its effect against the radial growth of the tested fungi. The best effect was against *R.solani* with *T. legnorum when* the obtained reduction percentages was obtained from the low, medium and high concentrations were (10.3-10.0), (23.1-132.0) and (23.1-12.0) respectively.

While the worst effect was obtained from the low, medium and high dose with *R.solani* and *T. harzianum* ,this gave (0.0-1.7) in medium dose.

2nd) Plant originated oils: The results obtained from these treatments gave low and moderate effect in general, the highest effect in best case was obtained from the garlic oil at low, medium and high dose giving (61.5-45.0), (64.1-44.0) and (69.2-48,0) reduction percentages in the radial growth of *R. solani* with *T. harzianum*, while the best reduction results obtained from mustard oil treatment giving (37.5-10.0), (50.0-10.0) and (50.0-10.0) reduction percentage respectively *in case* of *P. debaryanum with T. legnorum.*

The lowest effect came from mustard oil treatment with R.solani and V. albo-atrum with T. legnorum giving (6.6-0.0), (6.6-5.5) and (10.0-9.1) reduction percentages respectively.

Table (7): Effect of some biological sources on the anatgonism between *Rhizoctonia solani* and to antagonistic fungi

Mean and percentages of inhibition in m.m.									
Name and conc. / ppm		***R. solani***		***T.legnorum***		***R. solani***		***T.harzianum***	
		RG	**Rd**	**RG**	**Rd**	**RG**	**Rd**	**RG**	**Rd**
Control		39.0	00.0	50.0	00.0	30.0	00.0	60.0	00.0
Chlortetracycline	1000	35.0	10.3	55.0	-10.0	30.0	00.0	60.0	00.0
	2000	30.0	23.1	56.0	-12.0	25.0	16.6	65.0	-08.3
	a3000	30.0	23.1	56.0	-12.0	24.0	20.0	66.0	-10.0
Canestien	100	05.0	87.1	04.0	92.0	04.0	86.7	04.0	93.3
	200	05.0	87.1	04.0	92.0	04.0	86.7	04.0	93.3
	300	04.0	87.7	04.0	92.0	04.0	86.7	04.0	93.3
Mustard oil	250	25.0	35.9	60.0	-36.0	30.0	00.0	60.0	00.0
	500	20.0	48.7	70.0	-40.0	20.0	33.3	60.0	00.0
	1000	20.0	48.7	70.0	-40.0	20.0	33.3	60.0	00.0
Garlic oil	300	15.0	61.5	29.0	40.0	18.0	40.0	35.0	41.7
	400	14.0	64.1	28.0	44.0	17.0	43.3	33.0	45.0
	500	12.0	69.2	26.0	48..0	16.0	46.7	33.0	45.0
LSD 5%	**1.5**		**1.9**			**1.9**			**2.2**

RG = Radial growth
RD = Reduction percentage

Table (8): Effect of some biological sources on the anatgonism between *Verticillium albo-atrum* and two antagonistic fungi

Mean and percentages of inhibition in m.m.								
Name and conc.	***V,albo-atrum***		***T.legnorum***		***V.albo-atrum***		***T.harzianum***	
Ppm	**RG**	**Rd**	**RG**	**Rd**	**RG**	**Rd**	**RG**	**Rd**

Control		30.0	00.0	55.0	00.0	35.0	00.0	55.0	00.0
Chlortetracycline	1000	29.0	03.1	55.0	00.0	33.0	05.7	55.0	00.0
	2000	28.0	06.6	53.0	03.6	30.0	14.3	55.0	00.0
	3000	27.0	10.0	50.0	09.1	30.0	14.3	52.0	05.5
Canestien	100	04.0	86.7	04.0	92.7	04.0	88.6	04.0	92.7
	2 00	04.0	86.7	04.0	92.7	04.0	88.6	04.0	92.7
	300	04.0	86.7	04.0	92.7	04.0	88.6	04.0	92.7
Mustard oil	250	28.0	06.6	55.0	00.0	32.0	02.6	55.0	00.0
	500	28.0	06.6	52.0	05.5	30.0	14.3	55.0	00.0
	1000	27.0	10.0	50.0	09.1	30.0	14.3	50.0	09.1
Garlic oil	300	20.0	33.3	40.0	27.3	25.0	28.6	38.0	30.9
	400	18.0	40.0	40.0	27.3	23.0	34.3	38.0	30.9
	500	15.0	50.0	38.0	30.9	18.0	48.6	35.0	36.6
LSD5%		**2.05**		**1.8**		**4.8**			

1.5
RG = Radial growth
RD = Reduction percentage

Table (9): Effect of some biological sources on the anatgonism between *Fsolani* and two antagonistic fungi

Mean and percentages of inhibition in m.m.								
Name and conc. / ppm	***F. solani***		***T.legnorum***		***F.solani***		***T.harzianum***	
	RG	**Rd**	**RG**	**Rd**	**RG**	**Rd**	**RG**	**Rd**
Control	36.0	00.0	54.0	00.00	35.0	00.0	56.0	00.0
Chlortetracycline 1000	35.0	02.8	55.0	-01.90	35.0	00.0	56.0	00.0
2000	35.0	02.8	55.0	-01.90	35.0	00.0	55.0	01.7
3000	35.0	02.8	55.0	-01.90	35.0	00.0	55.0	01.7
Canestien 100	04.0	88.9	04.0	92.60	04.0	88.6	04.0	92.9
2 00	04.0	88.9	04.0	92.60	04.0	88.6	04.0	92.9
300	04.0	88.9	04.0	92.60	04.0	88.6	04.0	92.9
Mustard oil 250	30.0	16.7	60.0	-11.11	30.0	16.7	56.0	00.0
500	30.0	16.7	60.0	-11.11	30.0	16.7	56.0	00.0
1000	28.0	22.8	62.0	-14.80	30.0	16.7	56.0	00.0
Garlic oil 300	20.0	44.4	30.0	44.40	25.0	30.6	33.0	41.1
400	15.0	58.3	30.0	44.40	20.0	44.4	33.0	41.1
500	13.0	63.9	28.0	48.10	20.0	44.4	31.0	44.6
LSD 5%	**2.2**		**4.7**		**1.9**		**3.6**	

RG = Radial growth
RD = Reduction percentage

Table (10): Effect of some biological sources on the anatgonism between *S. sclerotiorum* and two antagonistic fungi

Mean and percentages of inhibition in m.m.								
Name and conc. / ppm	***S. sclerotiorum***		***T. legnorum***		***S. sclerotiorum***		***T.harzianum***	
	RG	**Rd**	**RG**	**Rd**	**RG**	**Rd**	**RG**	**Rd**

Control		35.0	00.0	52.0	07.7	33.0	00.0	57.0	00.0
Chlortetracycline	1000	33.0	05.7	56.0	-07.7	33.0	00.0	55.0	03.5
	2000	30.0	14.3	58.0	-11.5	32.0	03.0	55.0	03.5
	3000	30.0	14.3	60.0	-15.4	30.0	09.1	53.0	07.0
Canestien	100	04.0	88.6	04.0	92.3	04.0	87.9	04.0	93.0
	2 00	04.0	88.6	04.0	92.3	04.0	87.9	04.0	93.0
	300	04.0	88.6	04.0	92.3	04.0	87.9	04.0	93.0
Mustard oil	250	30.0	14.3	60.0	-15.4	28.0	15.2	61.0	-07.0
	500	30.0	14.3	60.0	-15.4	27.0	18.1	60.0	-05.3
	1000	28.0	20.0	60.0	-15.4	25.0	24.2	60.0	-05.3
Garlic oil	300	20.0	42.0	30.0	42.3	18.0	45.5	32.0	43.9
	400	15.0	57.1	30.0	42.3	15.0	54.5	31.0	45.6
	500	13.0	62.9	28.0	45.2	12.0	63.6	25.0	49.1
LSD 5%	**3.2**		**4.1**			**1.7**			**3.44**

RG = Radial growth
RD = Reduction percentage

Many of higher plant species have proven to be potential sources of antimicrobial agents useful in medicine and plant protection Kube and Taniguchi (1988) reported that judging from past successes, it is likely that compounds isolates from plant sources will exhibit the novel modes of action necessary for the development of future generation of antimicrobial agent. According it is highly desirable to develop new agent both to get spectrum activities against harmful microorganisms and to overcome any organisms expressing a resistant to presently available chemicals.

Table (11): Effect of some biological sources on the anatgonism between *Pythium debaryanum* and two antagonistic fungi

Mean and percentages of inhibition in m.m.								
Name and conc. / Ppm		*P. debaryanum*		*T.legnorum*		*P.debaryanum*		*T.harzianum*	
		RG	Rd	RG	Rd	RG	Rd	RG	Rd
Control		40.0	00.0	50.0	00.0	45.0	00.0	45.0	00.00
Chlortetracycline	1000	38.0	05.0	45.0	10.0	40.0	11.1	45.0	00.00
	2000	35.0	12.5	45.0	10.0	40.0	11.1	45.5	11.11
	3000	35.0	12.5	45.0	10.0	38.0	15.6	40.0	91.10
Canestien	100	11.0	72.5	04.0	92.0	15.0	66.6	04.0	91.10
	2 00	10.0	75.0	04.0	92.0	12.0	73.3	04.0	91.10
	300	09.0	77.5	04.0	92.0	11.0	75.6	04.0	91.10
Mustard oil	250	25.0	37.5	55.0	-10.0	35.0	22.2	45.0	00.00
	500	20.0	50.0	60.0	-20.0	30.0	33.3	50.0	-11.10
	1000	20.0	50.0	60.0	-20.0	25.0	44.4	50.0	-11.10
Garlic oil	300	20.0	50.0	32.0	36.0	25.0	44.4	30.0	33.30
	400	18.0	55.0	30.0	40.0	23.0	48.5	30.0	33.30
	500	15.0	62.0	30.0	40.0	20.0	53.5	25.0	44.40
LSD 5%		**3.2**		**3.2**		**1.06**		**1.95**	

RG = Radial growth
RD = Reduction percentage

Table (12): Effect of some biological sources on the anatgonism between *F. oxysporum f.sp.lycopersici and* two antagonistic fungi

Mean and percentages of inhibition in m.m.									
Name and conc. / Ppm		*F.oxysporum lycopersici*		*T. legnorum*		*F.oxysporum lycopersici*		*T.harzianum*	
		RG	Rd	RG	Rd	RG	Rd	RG	Rd
Control		32.0	00.0	58.0	00.0	30.0	00.0	60.0	00.0
Chlortetracycline	1000	28.0	12.5	60.0	-03.4	29.0	03.3	60.0	00.0
	2000	27.0	15.6	62.0	-06.9	29.0	03.3	60.0	00.0
	3000	27.0	15.6	63.0	-08.6	27.0	10.0	60.0	00.0
Canestien	100	04.0	87.5	04.0	93.1	04.0	86.7	04.0	93.3
	2 00	04.0	87.5	04.0	93.1	04.0	86.7	04.0	93.3
	300	04.0	87.5	04.0	93.1	04.0	86.7	04.0	93.3
Mustard oil	250	25.0	21.9	60.0	-03.4	26.0	13.3	60.0	00.0
	500	24.0	25.0	65.0	-12.1	25.0	16.7	63.0	-05.0
	1000	24.0	25.0	65.0	-12.1	24.0	20.0	65.0	-08.3
Garlic oil	300	15.0	53.1	35.0	39.7	16.0	46.7	36.0	40.0
	400	14.0	56.3	32.0	44.8	15.0	50.0	33.0	45.0
	500	13.0	59.4	31.0	46.5	15.0	50.0	33.0	45.0
LSD 5%		**2.6**		**4.6**		**2.9**		**2.8**	

RG = Radial growth
RD = Reduction percentage

Zehavi *et al* (1986) found that, saponin A and its depenzoylatad derivatives, saponin B, extracted from Styrax officinalis, L. inhibited growth of mycelial of T. viride in-vitro, while Lalitha,T. and Venkataranan,L. (1991) found that saponins isolated from defatted flour of Madhuca butyracea seeds caused maximum growth inhibition of T. viride (LD 50>500ppm).

Wilson *et al* (1997) in USA used a rapid assay to determine anti fungal activity in plant extracts and essential oils. They found that plant extracts showed high levels of anti fungal activity against *Botrytis cineria*.

According to essential oil, the assay demonstrated that palmarosa (*Cynbopogon martini),* redthyne (*Thymus zygis*), Cinnamon leaf (Cinnamomum zeylancium) and Clove buds (*Eugenia caryphyllatta*) had most anti fungal activity against *B. cineria*, also Ibrahim *et al* (1999) found that increase of garlic oil concentrations resulted in obvious inhibition of growth of most of *Trichoderma* spp. and pathogenic fungal isolates at concentration 1.6 % made the growth inhibition percents of *Trichoderma* isolates ranging between 0 and 67.6 % and between 100 % for pathogenic fungi , where it caused growth inhibition of *R. solani* by 100 % and *S. sclerotiorum* by 43.6 % . In addition, Lauer *et al* (1989) stated that *Alevrodical* as antifungal antibiotic isolated from mycelial culture of *Alevrodical* mirabilis inhibited *Verticillium* sp. in agar growth.

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تأثير بعض المصادر الحيويه والكيماويه على ظاهرة التضاد بين فطريات التربة

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تم دراسة تأثير بعض المواد الكيماوية فى صورة مبيد فطرى ومبيد حشائشي ومبيد نيماتودى ومبيد حشري وكذلك بعض المصادر الحيوية مثل المضاد الحيوي كلورو تترا سيكين وكانستين و زيت الخردل وزيت التوم على ظاهرة التضاد بين الفطريات الممرضة

F. oxysporum lycopersici, F. solani, Rh.solani

debaryanum P. ،V. albo-atrum, S. sclerotiorum

وفطريين من فطريات التضاد هما *T. legnorum,T.harzianum* وقد أوضحت النتائج أن مبيد الحشائش افالون اقترب فى التأثير فى درجة الإعاقة للنمو مثل المبيد الفطرى فيتافاكس 300 حيث منع كلا نمو الفطريات الممرضة والمضاده وكان فى مرتبة الثانية المضاد الحيوي كانستين حيث اعاق نمو الفطريات الممرضة والمضاده بدرجة عالية لكن اختلفت من فطر الى اخر حيث تراوحت نسبة الإعاقة للنمو بين (75-92) فى حالة الفطر الممرض *P.debaryanum* والفطر المضاد *T.legnorum* و(88.9-92.6) فى حالة الفطر الممرض *F.solani* ونفس الفطر المضاد السابق أما مع الفطر المضاد *T.harzianum* تراوحت مابين (73.3-91.1) ، (88.6-92.9) مع كلا الفطريين السابقين على التوالى وذلك فى التركيز الاوسط ثم جاء فى المرتبة الثالثة زيت الثوم حيث اعطى احسن نسبة إعاقة على الفطر الممرض *R.solani* مع الفطر المضاد *T.legnorum* فكانت نسبة الإعاقة (44-64.1) ولكن زيت الخردل اعطى احسن نسبة إعاقة (20-50) مع الفطر الممرض *P.debaryanum* والفطر المضاد *T.legnorum* فى كلا الحالتين وفى النهاية أعطى المبيد النيماتود فايديت اقل نسبة إعاقة (37.5—16) بنسبة للفطر الممرض *P.debaryanum* مع الفطر المضاد *T.legnorum* بينما اعطى المبيد الحشرى هوستاثيون اعلى نسبة إعاقة (40—20) على الفطر الممرض *R.solani* مع الفطر المضاد *T.harzianum*