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TOXICOLOGICAL STUDIES OF SOME PESTICIDES ON CERTAIN VEGETABLE CROPS PESTS

I- TOXICITY AND JOINT ACTION EFFECTS OF SOME COMPOUNDS AGAINST CERTAIN VEGETABLE CROPS PESTS

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ABSTRACT

The present study indicates the interaction between acaricides and fungicides, (i.e., Fenpyroximate, fenarimol and sulphur) and some of their alternatives (i.e. mineral oil, Kz-oil and black pepper extract) against both of the two-spotted spider mite *Tetranychus urticae* and the fungi, *Rhizoctonia solani* and *Fusarium moniliforme* which cause damping-off disease to vegetable crops (i.e. tomato, cucumber and pepper) as well as *Alternaria solani* which cause early blight disease of tomatoes and potatoes and was found associated with *T. urticae* under laboratory conditions. This would lead us to pick the compounds which could be used for the control of spider mite and associated fungi in the same time. The evaluation included also the joint toxic effects of tested compounds mixtures against adult female mites and tested fungi under laboratory conditions. The results showed that Animal dipping technique method was more toxic than leaf-disc dipping technique method. Fenpyroximate was the most toxic compound to adult female mites, the mineral oil (kz-oil) was gave moderate toxic effect and Fenarimol, black pepper extract and sulphur were the least toxic compounds to adult female mites. Fenarimol was the most toxic compound to all tested fungi. Fenpyroximate and black pepper extract gave moderate toxic effects,Sulphur was the least toxic compound and Kz-oil showed no toxic effects to all tested fungi up to concentration of 10^4 p.p. m.The results showed that, the poteniation effect against the adults of *T. urticae* was obtained with the mixtures of fenpyroximate + fenarimol, fenpyroximate + Kz-oil, fenarimol + sulphur, Kz-oil + black pepper extract and black pepper extract + sulphur . The results showed that all tested compounds reduced the mean numbers of the moving stages of mite during the first three days after treatment ,with different percent of reduction of the number according variety of plants.The data showed also that fenpyroximate and kz-oil gave high residual effect against the tested mite, while the activity of fenarimol, sulphur and black pepper extract were decreased by increasing the time after application. Results showed that all the tested combinations gave an antagonistic effect against *Fusarium moniliforme* except the combination of fenpyroximate + sulphur which gave an additive effect.Results showed that the combination of fenpyroximate + black pepper extract showed synergistic effect against *Rhizoctonia solani* **.**The mixtures of fenarimol + fenpyroximate, fenarimol + Kz-oil, fenarimol + sulphur, fenpyroximate + sulphur and sulphur + kz-oil. showed antagonistic effect against *Alternaria solani*:

INTRODUCTION

Two spotted spider mites, *Tetranychus urticae* is considered as one of the major pests attacking different agricultural crops such as field crops, fruits, ornamental plants and vegetables. The infestation by mites caused a great damage to these infested plants followed by a secondary infestation by various pathogens such as virus, bacteria and fungi. The latter organism i.e.

fungi caused serious problems in the field of agriculture. Great attention is offered to survey and control of both pests to protect the crops and then to minimize the loss in agricultural economy.

Veire *et al.* (1992); Abbassy *et al.* (1993) and Megali *et al.* (1995) mentioned that *Tetranychus urticae* infested a wide range of economic plants in the field and under glass houses such as cucumber and tomatoes . Tomato, cucumber and pepper are considered as the most popular and important vegetables for fresh consumption in Egypt.

Fungi caused many diseases in the field crops and vegetables. *Alternaria solani* caused early blight disease of tomatoes and potatoes. Some important seed and soil born fungi particularly those causing damping-off disease, *Rhizoctonia solani* and *Fusarium moniliforme* are the most frequent fungi causing damping-off disease to many field crops and vegetables (Roman *et al.,* 1982; De and Cattopadhyay, 1984; Ali *et al.*, 1992 and El-Shami *et al.*, 1993.

The aim of this work is to study the effect of acaricides as fungicides (the fungicidal action of acaricides) or the effect of fungicides as acaricides (the acaricidal action of fungicides) as new method to control both fungi and mites in the same time to minimize the use of pesticides to avoid environmental pollution with over quantities of pesticides.

MATERIALS AND METHODS

1-Tested organisms:

1-a. Spider mite, *Tetranychus urticae:*

Spider mite *Tetranychus urticae* (Acarina: Tetranychidae) colonies were obtained from castor bean plants from Kafr El-Sheikh Governorate and reared under laboratory conditions on castor bean; *Ricinus communis* (L.) for about eight (8) months away from any contamination with pesticides before starting the experiments. 5-8 seeds of castor bean were planted in one pot for 10-15 days. The seedlings were infested by clean culture of red mites. Mites were transferred from old to young plants by cutting heavily infested leaves into small sections which were then placed on new plants. Contamination was prevented by placing these seedlings in special chambers, 50 x 50 x 60 cm. covered with muslin.

These cultures were maintained in a breeding room under a temperature of 25 $\pm$ 2 ^{o}C and 60 – 70 R.H. and 12 hours daily illumination by 2 fluorescent bulbs of 40 wts each.

Mites were collected by placing the infested castor bean leaves on white paper, then the full mature individuals were chosen and transferred by using a fine brush (No. 000).

1-b.Fungi:

1-b-1- Isolation, purification and identification of pathogens:

Three fungi were used in this study namely *Alternaria solani* that causes early blight disease in potatoes and tomatoes and fruit rot of tomato and pepper. This fungus was isolated from tomato fruits and leaves.

Fusarium moniliforme and *Rhizoctonia solani* that causes damping -off (Root-rot) in tomatoes, cucumber and pepper were isolated from tomatoes, cucumber and pepper roots. Infested pieces of leaves, fruits and roots were surface sterilized with 5% chlorox solution for 2 minutes, and washed several times with sterilized water. The surface sterilized pieces were then dried between two sterilized filter papers and allowed to grow in petri dishes which contain potato dextrose agar medium (PDA) amended with 25 mg/ml streptomycin sulfate to avoid bacterial contamination. The petri-dishes incubated at 27 ± 3 °C for 3-10 days and examined daily for the occurrence of fungus growth. The growing fungi were examined microscopically and purified using the hyphal tip technique, then transferred to PDA slants. Pathogenic isolates were identified according to their cultural and microscopical characters (Barnett and Hunter 1979**).** Slants were maintained in a refrigerator at 4 °C as a stock cultures for further experiments.

1-b-2.The pathogenicity tests of *Rhizoctonia solai* and *Fusrium moniliforme*:-

The present test was carried out by using autoclaved sandy-loam soil. Bathes of soil were infested separately with inoculum of each isolate at the rate of 50 gm (colonize sand-maiz meal/ kg of soil).Infested soil was dispensed in 10-cm diameter plastic pots, and these pots were planted with 10 seeds per pot[cucumber. (Beta-alpha) or tomato (Kasel-Rock) or pepper (California-wander)].In the control treatment, sterilized sand-maiz meal were mixed with the soil at the same rate. Pre-emergence damping-off was recorded 15 days after planting and post-emergence damping-off was recorded 30 days after planting (Shatla *et al*., 1983).

1-b-3.The pathogenicity test of *Alternaria solani*:

This experiment was used according to the method described by El-Helaly *et al*. (1971), and Van Vliet and Meijsing (1974).

2-Tested Compounds :

Five compounds were used in this study. All tested compounds were in the formulated form and dosage were calculated on the basis of ppm. of active ingredient. The structure and chemical names of the tested compounds are as follows.

2-a.Acaricide:

– Ortus : The common name is – fenpyroximate (5% S.C.)
The IUPAC name is: tert-butyl (E)-α- (1, 3-dimethyl -5- phenoxy pyrazol-4-yl methylene-amino-oxy) = P-toluate.
It was supplied by Nihon Nohyaku Company-Tokyo-Japan.

2-b.Fungicides:

Rubigan: The common name is – fenarimol (12 % E-C,)
The IUPAC name is: (±) -2,4'-dichloro- α -(pyrimidin-5-yl) benzhydryl alcohol.
It was supplied by Eli lilly Company Dow Elanco jermany

2-c. Flowable sulphur: (52% S.C.) provided by stoller chemical Company –U.S.A

2-d. Mineral oil:

Kz-oil: formulated mineral oil supplied by kafr El-Zayat for pesticides and chemicals Company as 95% E.C. This oil is recommended to control the scale insects in Egypt.

2-e. Plant extract of black pepper (*Piper nigrum* fruits):

The plant extract was prepared according to Abbassy *et al*. (1993) .

3- Toxicity of the tested compounds against adult females of two-spotted spider mite, *Tetranychus urticae* (koch):

Two different methods were used, one of them was: the leaf-disc dip technique and the second was animal dipping technique according to Siegler (1947).

Mortality counts were made 24, 48 and 72 hours after treatment. Correction for the control mortality was made by using Abbott's Formula (1925). Data were plotted on log-dosage probit papers and statistically analyzed by the method of Finney (1952**).**

4- Fungicidal activity:

Radial growth technique was used to test the fungicidal activity of the tested compounds according to Targason (1969) and Nene (1971).

Four replicates were made for each treatment. The percent of inhibition (I%) in the hyphal growth was calculated according to Tops and Win formula (1957**)**:

5- Joint toxic effects of the tested compounds against *Tetranychus urticae*

To determine the toxic effect of applying pairs of the tested compounds, the expected Lc_{25} doses of each compound was applied, thus 50% mortality was expected to result when the mixture was used. The joint action effect was evaluated by the equation of (Mansour *et al*., 1966**)**.
Correction of control mortality was made using Abbott's Formula (1925**)**

6- Joint toxic effects of tested compounds against *Rhizoctonia solani, Fusarium moniliforme and Alternaria solani*

Ic_{25} from each tested compound was mixed with Ic_{25} from every other compound alone. The joint toxic action effects of the different combinations were evaluated by the equation of (Mansour *et al.,* 1966*).*

RESULTS AND DISCUSSION

1-Toxicity of the tested compounds against adult females of two-spotted spider mite, *Tetranychus urticae* under laboratory conditions:

1-a. Leaf-disc dipping technique

The leaf-disc dipping technique was used to evaluate the toxicity of the tested compounds i.e. two fungicides (fenarimol and sulphur), one acaricide (fenpyroximate), one mineral oil (Kz-oil) and black pepper extract (*Piper nigrum*) against the adult of two-spotted spider mite *T. urticae* (koch.) under laboratory conditions.Results are recorded in table (1). Data showed that fenpyroximate was the most toxic compound followed by fenarimol and Kz-oil as a natural poison and the effect was not affected by increasing the time up to 72 hours. While sulphur compound and black pepper extract were not toxic up to 50000 p.p.m to the tested mite for 72 hours.

1-b. Animal dipping technique

The animal dipping technique was used to evaluate the toxicity of the same tested compounds against the same adult of the mite of *T. urticae* under laboratory conditions. Data in table (1) showed that fenpyroximate was the most toxic compound followed by Kz-oil and black pepper extract, and their were no changes in their effects by increasing time, while sulphur compound caused weak toxicity.These results are in full agreement with that of Cho *et al*. (1993)**,** who found that fenpyroximate was very active to all life stages of mite, *T. urticae.* Vostrel (1996) found that fenpyroximate gave 84.5% and 100% mortality at 0.0l and 0.05% concentrations. Also fenpyroximate was found effective against *T. urticae* by many investigators, (Gamieh and Saadoon 1998**,** Derballa 1999 and El-Fakharany 2000)**.** On the other hand, El-Banhawy and Abou-Awad (1985**)** indicated that the datura mite, *Eriophyes datura* was susceptible to moderate concentrations of fenarimol(fungicide). Black pepper extract showed an acaricidal activity against the tested mite in the present investigation. This result can be supported with those obtained by Barakat *et al*. (1985a), who found that acetone extract of black pepper (*Piper nigrum*) was toxic to adult stage of *T. urticae*.

Mineral oil (Kz-oil) showed moderate acaricidal activity against the tested mites, this result can be supported with those obtained by several investigators, Badawy (1997), Osman (1997), Risk *et al*. (1999), Gamieh *et. al*., (2000) and El-Fakharany (2000)**.**They reported that mineral oils showed good acaricidal effect against phytophagous mites

Results also showed that sulphur gave weak acaricidal effect. This finding is in agreement with that obtained by Perring (1987) who reported that sulphur gave poor control to the mite population in the field conditions, Gough (1990**)** indicated that sulphur was largely ineffective against *T. urticae* on field roses. While kovach and Gorsuch (1986) found that sulphur was toxic to *T. urticae* by using the slide-dip method.

Table (1): Toxicity of tested compounds against adult females of two-spotted spider mite *Tetranychus urticae* using leaf-disc dip technique and animal dipping technique (after 24 , 48 and 72 hours).

Compounds	Leaf-disc dip technique					Animal dipping technique			
	Time	LC_{50} p.p.m	Confidence limits for LC_{50}		Slope	LC_{50} p.p.m	Confidence limits for LC_{50}		Slope
			Lower	Upper			Lower	Upper	
Fenpyroximate	24 hrs.	319.9	260.2	394.91	1.45	5.6	4.23	7.3	1.68
Fenarimol		-	-	-	-	-	-	-	-
Sulphur		-	-	-	-	-	-	-	-
K z-oil		9400	6646	12203	1.48	986	746	1343	1.37
Black pepper extract		-	-	-	-	3735.3	2825	4874	1.54
Fenpyroximate	48 hrs.	103.5	77	135	1.49	2.76	1.98	3.54	2
Fenarimol		3715.53	3167	4454	2.01	2385	1776	3605	1.42
Sulphur		-	-	-	-	46335.57	26969	128958	0.94
K2-oil		9400	6646	12203	1.48	986	746	1343	1.37
Black pepper extract		-	-	-	-	3735.3	2825	4874	1.54
Fenpyroximate	72 hrs.	58.74	40	77	1.52	2.06	1.41	2.64	2.25
Fenarimol		2428.6	2001	2924	2.47	1330.79	1015	1753	1.49
Sulphur		-	-	-	-	18298.7	12416	31353	1.02
K2-oil		9400	6646	12203	1.49	986	746	1343	1.37
Black pepper extract		-	-	-	-	3735.3	2825	4874	1.54

2-Toxicity of the tested compounds against *Rhizoctonia solani*, *Fusarium moniliforme* and *Alternaria solani* under laboratory conditions:

2-a. Fungicidal activity of different tested compounds against *Rhizoctonia solani*:

The data in table (2) showed that fenarimol (fungicide) was very toxic against the fungus *R. solani* followed by fenpyroximate (acaricide) . While black pepper extract have a moderate fungitoxic effect against *R. solani*,sulphur (fungicide) showed the lowest toxic effect against the tested fungus . The mineral oil Kz-oil was not effective against the tested fungus, up to 10^4 p.p.m.

Different chemical groups of pesticides and plant extracts were applied against the fungus by many investigators. El-Doksh (1976**)** found that chlorobenzilate and dicofol (acaricides) were highly toxic at 1000 p.p.m against *Rhizoctonia solani*.

Madkour *et al*. (1988) reported that fenarimol inhibited the growth of *R. solani.* Mitani *et al*. (1995) indicated that propargyl N-(6-ethyl-5-iodo-2-pyridyl) carbamate exihibited high fungitoxic activities against *R. solani* at 0.1 p.p.m in vitro and 8 to 63 p.p.m in vivo.

Shalaby *et al*. (1997**)** indicated that Homai 80 was the most effective fungicide against *R. solani* followed by Benlate and Vitavax thiram. Shimoni *et al*. (1993**)** found that oil extracted from *Origanum syriacum* inhibited the growth of *R. solani* by 80-100%. Fewell *et al*., (1994**)** indicated that solamargine and solasonin extracted from berries of *Solanum khasianum*, inhibited mycelium development of *R. solani.* Carcia and Lawas (1990) found that the garlic and *Piper nigrum* extracts were effective against *R. solani*.

2-b. Fungicidal activity of the tested compounds against *Fusarium moniliforme*:

Data in table (2) showed that fenarimol was the most potent compound against the fungus *Fusarium moniliforme* followed by black pepper extract and fenpyroximate (acaricide), while sulphur showed the lowest toxic compound, on the other hand Kz-oil showed no fungicidal activity against the tested fungus at 10^4 p.p.m. Different chemical groups of pesticides and plant extracts were applied against various species of fungi by many investigators. Zein *et .al (*1984)found that Benlate (fungicide) was the most potent compound against *Fusarium oxysporum.* Zein and Abdel-Baki (1988**)** reported that deltamethrin was the most fungitoxic compound against *Fusarium solani*. Shalaby *et al.* (1997) indicated that Homai 80 was the most effective fungicide against *Fusarium spp*. followed by Benlate and Vitavax thiram, while Monceren 25% was the least effective.Miah *et. al (* !990)found that the extract of *Leucaena leucocephala* inhibiting more than 50% of normal fungal growth of *F. moniliforme*. Yegen *et al*. (1992**)** indicated that the essential oil of *Thymbra spicata* and *Satureja thymbra* were the most effective in inhibiting mycelial growth of *Fusarium moniliforme.*

2-c. Fungicidal activity of the tested compounds against *Alternaria solani*.

Data in table (2) showed that fenarimol was the most toxic compound against *Alternaria solani* followed by fenpyroximate, black pepper extract Sulphur showed the least toxic compound against *A. solani* . On the other hand kz-oil showed no fungicidal activity against the tested fungus at 10^4 p.p.m. Different chemical groups of pesticides and plant extracts were applied against various species of fungi by many investigators.

Daoud *et al*. (1990), found that benomyl was the most toxic compound against *Alternaria spp.* followed by fluazifos and Decis (deltamethrin). Badawy (1997) found that dicofol was the most potent compound against *Alternaria alternata* followed by mancozeb, benomyl and propargite but Kz-oil showed no toxic action up to 2000 p.p.m.

Derballa (1999) found that dicofol was the most toxic compound followed by fenpyroximate, bupirimate, cypermethrin and promopropylate against *Alternaria solani* Ali *et al*. (1992) found that neem oil exhibited antifungal activity against *Alternaria alternata*. Kole *et al*. (1993) indicated that the essential oils from 4 types of *Citronella winterianus* exhibited antifungal activity against *A. solani*.

3-a. Joint toxic effects of the tested compounds against adult females of two-spotted spider mite, *Tetranychus urticae* (koch.) under laboratory conditions.

Data presented in table (3) show the joint effect of mixtures on adult tested mites. The values of co- toxicity factor indicated that a synergistic effect for the combinations of fenpyroximate + fenarimol, fenpyroximate + Kz-oil, fenarimol + sulphur, Kz-oil + black pepper extract and sulphur + black pepper extract increased the toxicity, an antagonistic effect was observed for the combinations of fenpyroximate + sulphur, fenpyroximate + black pepper extract., fenarimol + Kz-oil, fenarimol + black pepper extract and Kz-

oil,+sulphur. These results are in agreement with that obtained by Barakat *et al*. (1985 b) who found that the mixture of diethyl ether of black pepper extract with pilctran, sumicidin and deltamethrin showed synergistic effect against adult females of mite, *T. urticae.*The same effect was obtained with the mixture of black pepper acetone extract with sumicidin, cypermethrin and deltamethrin, Badawy (1997) reported that the potentiation effect was obtained with the mixtures of dicofol + Kz-oil, dicofol + firty-x , propargite + benomyl, propargite + Kz-oil, propargite + firty – x, mancozeb + Kz-oil and Kz-oil + fitry-x. While the antagonistic effect was noticed when benomyl was combined with firty-x and mancozeb + firty-

Table (3): Toxicity of binary mixtures of tested compounds to *Tetranychus urticae*:

Combinations	Observed% mortality	Co-toxicity factor
Fenpyroximate + fenarimol	85 %	+ 70
Fenpyroximate + sulphur	14%	- 72
Fenpyroximate + Kz-oil	78%	+ 56
Fenpyroximate + black extract pepper*	24%	-52
Fenarimol + Kz-oil	30%	-40
Fenarimol + sulphur	73.4%	+ 46.8
Fenarimol + black pepper extract	35 %	- 30
Kz-oil + sulphur	28 %	- 44
Kz-oil + black pepper extract	75%	+ 50
Black pepper extract + sulphur	65%	+ 30

*** black pepper extract (*piper nigrum*)**

Co-toxicity factor= $\frac{\text{Observed \% mortality – Expected \% mortality}}{\text{Expected \% mortality}}$ **X 100**

Where : + 20 or more = synergistic effect Between + 20 and – 20 = additive effect.
- 20 or more = antagonistic effect

Nassef (1998) reported that mineral oil improved the efficiency of tedifol, furathiocarb and pirimiphos-methyl when combined with them (at 1:10) against sucking pests. Gamieh et.al., (2000) found that the combination of Kz-oil with Vertimec and Neron half dose for each improved and increased the efficiency of these acaricides against *T. cucurbitacearum* under field conditions. El-Fakharany (2000**)** indicated that fenpyroximate was potentiated when mixed with mineral oil (CAPL-2) or plant extracts (black cumin and wormseed) against *T. urticae* under laboratory conditions.

4- Joint toxic effects of the tested compounds against the tested fungi under laboratory conditions:

4-a. Joint toxic effects against *Rhizoctonia solani*:

Table (4) show the Joint effects of compounds in pairs on the tested fungus. The values of co-toxicity factor indicate that the combination of fenpyroximate + black pepper extract caused synergistic effect.

Meanwhile antagonistic effects were observed for the combinations of fenarimol + sulphur and fenpyroximate + Kz-oil. But additive effects were

observed for the combinations of fenarimol + fenpyroximate, fenarimol + Kz-oil, fenarimol + black pepper extract, fenpyroximate + sulphur, black pepper extract + Kz-oil, black pepper extract + sulphur and Kz-oil + sulphur. Many investigators evaluated the joint toxic effects of different pesticides against the fungus. Zein *et .al*., (1984), Ahmed *and Ali* (1990) and Abdel-Aziz *et .al*., (1996).

4-b. Joint toxic effects against *Fusarium moniliforme*:

The Joint toxic effect were evaluated against the tested fungus.Data in table (4) show the joint toxic effect of finarimol, fenpyroximate, sulphur, black pepper extract and Kz-oil mixtures in pairs on the tested fungus.The values of co-toxicity factor indicated that all the tested combinations gave an antagonistic effect against the fungus except the combination of fenpyroximate + sulphur which gave an additive effect.More studies were carried out to evaluate the Joint toxic effect of different pesticides against *Fusarium spp.* Zein *et al*., (1990), Kataria and Verma (1993) and Ehteshanulhaque and Ghaffar (1995).

4-c.Joint toxic effects against *Alternaria solani:*

The Joint toxic effects of fenarimol, fenpyroximate, sulphur, black pepper extract and Kz-oil mixtures were evaluated against *Alternaria solani*. Data in table (4) show that the values of co-toxicity factor indicated that an antagonistic effect were observed for the combinations of fenarimol + fenpyroximate, fenarimol + kz-oil, fenarimol + sulphur, fenpyroximate + sulphur and sulphur + Kz-oil. On the other hand additive effects were observed for the combinations of fenarimol + black pepper extract, fenpyroximate + kz-oil, fenpyroximate + black pepper extract, black pepper extract + Kz-oil and black pepper extract + sulphur.

Many studies were carried out to evaluate the joint toxic effect of different compounds against *Alternaria spp .*Roman *et al*. (1982) indicated that a mixture of Dithane M-45 (mancozeb) at 0.2% + Decis 2.5 e.c. (deltamethrin) at 0.05% gave best control of *Alternaria solni* on tomatoes. Badawy (1997**)** reported that an antagonistic effect was observed against *A. alternata* when mixing dicofol, propargite and mancozeb with nutrient (firty-x), but the mixture of benomyl + firty-x caused an additive effect.

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REFERENCES

Abbassy, M. A.; Sh. E. E. El-Hamady and M. A. Abd-Elbaki (1993).Efficiency of certain natural and synthetic pesticides incontrolling whiteflies and mites on cucumber grown under plastictunnels. J. Agric. Res. Tanta Univ., 19 (2) : 474-479

Abbott, W. S. (1925). A method of computin the effectiveness of insecticide. J. Econ. Entomol., 18 : 265-267.

Abdel-Aziz, M. A.; S. M. M. Mahmoud and A. A. Ismail (1996).Impact of imidacloprid insecticide on efficacy of some fungicides in controlling damping -off and root rot diseases of cotton seedlings. J. Agric. Res. Tanta Univ., 22 (2) : 243-255.

Ahmed, J. M. and H. H. Ali (1990) .Chemical control of cottondamping off in Ninevah province, Iraq. Arab. J. Plant Protec., 8 (1):6-11

Ali, T. E. S.; M. A. Nasir and A. S. Shakir (1992). In vitro evaluation of certain neem products as mould inhibitors against post-harvest fruit rotting fungi of tomato. Pakistan j. Phytopath., 4(1-2): 58-61

Badawy, M. El-Taher (1997).Studies on the analysis of certain pesticide residues. (Analysis and toxicity of certain acaricide and fungicide residues" M. Sc. Thesis, Fac. Agric., Alex. Univ.

Barakat, A. A.; G. M. Shereef; S.A. Abdallah and S. A. A. Amer (1985 a) Toxic action of some plant extracts against *Tetranychus urticae* Koch. Bull. Ent. Soc. Egypt, Econ. Ser.,14:233-24

Barakat, A. A.; G. M. Shereef; S. A. Abdallah and S. A. Amer (1985 b).Joint action of some pesticides and plant extracts against *Tetranychus urticae* Koch. Bull. Ent. Soc. Egypt. Econ. Ser., 14 : 243-249.

Barnett, H. L. and B. B. Hunter (1979).Illustrated Genera of Imperfect fungi 3rd Ed. Burgess Publishing Company. Minncapolis,Minesota, 241 p.

Carcia, R. P. and M. V. P. Lawas (1990).Potential plant extracts for the control of Azolla fungal pathogens. Philippine Agriculturist. 73 (3-4) : 343 –348.

Cho, J. R.; Y. H. Choi; N. J. Park and K. Y. Cho (1993). Comparative toxicities of selected acaricides against the two spotted spidermite (*Tetranychus urticae* koch) to establish the screeningsystem for new acaricidal chemical compounds. Korean. J. Appl.Ent., 32(2): 123-128.

Daoud, A. S.; N. A. Qasim and N. M. Al-Mallah (1990).Comparison study on the effect of some plant extracts and pesticides on some phytopathogenic fungi. Mesopotamia J. Agric., 22 (4): 227-235.

De, B. K. and S. B. Chattopadhyay (1984).Evaluation of fungicides against early blight disease of potato caused by *Alternaria solani*. Pesticides., 18 (10) : 52-53.

Derballa, A. S. H. (1999).Integrated pest management of spider mites. M. Sc. Thesis, Fac. Agric., Tanta Univ.

Dohroo, N. P. and S. K. Gupta (1995).Neem in plant disease control. Agricultural Reviews Karnal., 16 (3) : 133-140.

Ehteshamulhaque, S. and A. Ghaffar (1995). Effect of Bradyrhizobium japonicum and fungicides in the control of root rot disease ofsoybean. Pakistan Journal of Botany., 27 (1) : 227-232.

El-Banhawy, E. M. and B. A. Abou-Awad (1985). Toxicity of the organophosphate, methamidophos and pyrethroid, cypermethrin, and the systemic fungicide, fenarimol to adult and egg stages of the datura mite, *Eriophyes datura* (Acari: Eriophyidae). Bull. Ent.Soc. Egypt Econ. Ser., 14 : 199-205.

El-Doksh, H. A. (1976).Laboratory and field evaluation of certain pesticides and their mixtures against some cotton pests. M. Sc. Thesis, Fac. of Agric. Alex. Univ.

El-Fakharany, S. K. M. (2000).Ecological, biological and toxicological studies on some pests infesting of some vegetable crops M. Sc. Thesis. Fac. Agric., Tanta Univ.

El-Helaly, A. F.; I. A. Ibrahim; H. M. El-Arosi and Y. M. Fahaam (!971).Studies on leaf spots and fruit rots of tomato in U.A.R.(Egypt). U.A.R.J. Phytopath., (3) : 91-108.

El-Shami, M. A.; G. H. A. Nagi and N. A. R. Abdel-Nour (1993). Effect of fungicides and herbicides interactions on tomato damping-off and plant growth. Egypt. J. Agric. Res., 71(3):641-658

Fewell, A. M.; J. G. Roddick and M. Welssenberg (1994). Interactions between the glycoalkaloids solasonine and solamargine in relation to inhibition of fungal growth. Phytochem.,37 (4) : 1007-1011.

Finney, D. J. (1952). Probit analysis. Cambridge University press, NewYork. 256p.

Gamieh, G. N. and S. E. Saadoon (1998). Effect of certain acaricides and biochemical compounds on *Tetranychus cucurbitacearum (*Sayed) in the laboratory and soybean field. J. Agric. Sci. Mansoura Univ., 23 (6) : 2739-2746.

Gamieh, G. N. and S. E. Saadoon ;A. M. Nassef and A. A. Younes (2000). Efficacy of mineral oils, acaricideds andtheir mixtures against *Tetranychus cucurbitacearum* (sayed). Zagazig, J.Agric. Res.,27 (2):591-601.

Gough , N. (1990). Evaluation miticides for the control of two-spotted mite Tetranychus urticae koch on field roses in southern Queensland . Crop- Protection.,9 (2): 21-30 .

Kataria, H. R. and P. R. Verma (1993) .Interactions of fungicide and insecticide combinations against *Rhizoctonia* damping-off and root rot in canola. Annals of Applied Biology., 123 (2) : 233-246.

Kole, C.; S. Pattnaik; V. R. Subramanyam and A. Narain (1993). Antifungal efficacy of oil and its genetic variability in citronella .Crop Research (Hisar). 6 (3) : 509-512.

Kovach ,J. and C. Ggorsuch (1986). Response of the two-spotted spider mite *Tetranychus urticae koch , t*o various insecticides and fungicides used in south Carolina peach orchards. J. Agr.Ent. ,3 (2):175-178.

Madkour, M. A.; M. R. A. Shehata; S. A. Farag and E. E. Wagih (1988) . Ethylene as a mediator of Rubigan biological action in cowpea plants. J. Phytopathol., 121 (3) : 224-232.

Mansour, N. A.; M. E. El-Defrawi; A. Toppozada and M. Zeid (1966)Toxicological studies on the Egyptain cotton leaf worm *Prodenia litura*. VI-Potentiation and antagonism of organophosphorus and carbamate insecticides. J. Econ .Entomol., 59 : 307-311.

Megali, M. K.; A. M. Mostafa; M. A. Darwish and A. M. Gabr (1995).Efficiency of some acaricides against the two-spotted spider mite *Tetranychus urticae* Koch on cucumber plants. Egypt.J. Agric. Res., 73 (2) : 403-410.

Miah, M. A. T.; H. Ahmed; N. R. Sharma; A. Ali and S. A. Miah (1990). Antifungal activity of some plant extracts. Bangladesh. J .Botany., 19 (1) : 5-10.

Mitani, S.; K. Nakano; N. Matsuo and T. Komyoji (1995). Biological properties of fungitoxic propargyl N (6-ethyl-5-iodo-2-pyridyl) carbamate. J. Pest. Sci., 20 (2) : 153-160.

Nassef, A. M. A. (1998). Toxicological studies on some sucking pests and their natural enemies. Ph.D.Thesis, Fac. Agric-Kafr-El-Sheikh Tanta Univ.

Nene, Y. L. (1971). Fungicides in plant disease control. Oxford and IBH publishing Co. P 54.

Osman, M. S. (1997). Petroleum oils as a component of integrated pest management of phytophagous mites. Arab. Gulf Journal of scientific Research., 15 (1) : 125-135.

Perring, T. M. (1987).Seasonal abundance spray timing and acricidal control of spider mites on cantaloupe . J. Agr. Ent., 4(1) : 12-20.

Risk, M. A.; A. G. El-Sisi; N. A. Badr and N. M. Abdel-Halim (1999). Controlling of cotton sucking pests using safe materials. 2nd ,Int. Conf. Pest Cont., Mansoura, Egypt, sept., 211-221.

Roman, T.; N. Dragomir; M. Costache; V. Lemeni; M. Echert and G.Catrina (1982).The compatibility of some pesticides used for simultaneous control of pathogens and pests in field tomatoes.Productia-Vegetala-Horticultura., 31 (7) : 5-8.

Shalaby, M. S.; A. Z. Aly and A. E. A. Ismail (1997).Chemical and biological control of some soil borne fungi under entercropping conditions of maize and soybean. Egypt. J. Agric. Res., 75 (2):303-320.

Shatla, M. N.; Z. El-Shennawy; A. M. Besiony; S. El-Khateeb and E .Z. Khalifa (1983).Interaction between *Rhizoctonia solani and Rhizobium Japonicum* on soybean. Menofiya J. Agric. Res., 6 48-59.

Shimoni, M.; R. Reuveni and U. Ravid (1993).Growth inhibition of plant pathogenic fungi by essential oils. Hassadeh., 73 (3) : 306-308.

Siegler, E. H. (1947).Leaf disc technique for laboratory tests for of acaricides. J. Econ. Entomol., 40 : 441-442.

Targason, D. C. (1969). Fungicides. Voll: Agricultural and industricel applications environmental interactions. Academic press, New York and London P 93.

Van Vliet, G. J. A. and W. D. Meijsing (1974). Inheritance of resistance to *Pseudoperonospora cubensis* Rost.in cucumber (*Cucumis sativus* L.) Euphytica, 23: 251-255.

Veire, M. Vane-de; D. Degheele; Vane-De-veire and M-Van-DeVeire (1992).Twospotted spider mite *Tetranychus urticae*.,control with fenpyroximate and its possible use in IPM in glasshouse tomatoes and cucumber. International Symposium on Crop Protection. Mededlingen-vane-de-Faculteit-Landbouwweteschappen-Rijksuniversiteit-Gent. 57 (3A) : 925-929

Vostrel , J. (1996). The results of laboratory experiments and their possible utilization in hop protection strategy against pests . Rostlinna Vyroba ,42 (7) :329-331.

Yegen, O.; B. Berger and R. Heitefuss (1992). Studies on the fungitoxic effects of extracts of six selected plants from turkey on phytopathogenic fungi. Zeitschrift. Fur Pflanzenkrheiten und Pflanzenschutz., 99 (4) : 349-359.

Zein, A. A.; M. A. Ashry; A. S. El-Nawawy and A. I. Anter (1984). The influence of some herbicides on the fungicidal action of some fungicides. J. Agric. Res. Tanta Univ., 10 (4) : 1482-1490.

Zein, A. A. and M. A. Abdel-Baki (1988). Fungicidal activity of some insecticides. J. Agric. Res. Tanta Univ., 14 (1) : 387-397.

Zein, A. A.; M. A. Ashry; A. E. El-Sherbeni and A. Ismail (1990). Fungicidal toxicity and Joint fungitoxic action of some pesticides .J. Agric. Res., Tanta Univ., 16 (4) : 809-817.

دراسات تكسيكولوجية لبعض المبيدات على بعض آفات محاصيل الخضر:

١-التأثيرات السامة و الفعل المشترك لبعض المركبات على بعض آفات محاصيل الخضر.

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تم دراسة تأثير بعض المبيدات الأكاروسية والفطرية وهى الفينبيروكسميت والفيناريمول والكبريت وبعض بدائل المبيدات ومنها الزيت المعدنى منتج شركة كفرالزيات للمبيدات والمستخلص النباتى لبذرة الفلفل الأسود ضد الحيوان الكامل للحلم العنكبوتى ذو البقعتين معمليا وتحت ظروف الصوب البلاستيكية. وكذلك ضد فطريات الريزوكتونيا سولاتى والفيوزاريوم مونيليفورم التى تسبب عفن الجذور لمحاصيل الخضر (الطماطم – الخيار – الفلفل) بالإضافة إلى فطر الألترناریاسولانى الذى يصيب نباتات الخضر بعد إصابتها بالأكاروس معملياً تحت ظروف الصوب البلاستيكية وذلك بهدف الحصول على مركبات لها خواص ابادية على الأكاروس و الفطريات فى نفس الوقت.إتضح أن استخدام طريقة غمر الأقراص الورقية بالأفراد الكاملة لإناث العنكبوت فى تركيزات من المركبات المختبرة كانت أكثر سميةمن طريقة غمر الأقراص الورقية فى تركيزات من المركبات المختبرة ثم تنقل الأفراد الكاملة لإناث العنكبوت على هذه الأقراص بعد جفافها و أن الفينبيروكسميت كان أكثر المركبات سمية أماالزيت المعدنى (ك – زد) كان له سمية متوسطة بينماكان الفيناريمول والمستخلص النباتى لبذور الفلفل الاسود والكبريت أقل المركبات سميةو بدراسة التأثير الإبادى لنفس المركبات المختبرة ضد فطريات الريزوكتونيا سولانى والفيوزاريوم مونيليفورم التى تسبب عفن الجذور لمحاصيل الخضر (الطماطم – الفلفل – الخيار) وكذلك فطر الألترناریاسولانى الذى يسبب مرض الندوة المبكرة للطماطم والبطاطس كان الفيناريمول أكثر المركبات المختبرة سمية ضدالفطريات المختبرة يليه الفينبيروكسميت والمستخلص النباتى لبذور الفلفل الأسود بينما كان الكبريت أقل المركبات المختبرة سمية

ضدهاولم يظهر الزيت المعدنى (ك – زد) تأثير سام ضد كل الفطريات المختبرة تحت التركيزات المختبرة حتى ١٠ ٤ جزء فى المليون. وبدراسة التأثيرالسام المشترك لخلائط المركبات المختبرة عن طريق حساب معامل السمية المشترك وجد أن بعض المخاليط أحدثت تأثير "تنشيط" وهذه المخاليط هى: الفينبيروكسميت + الفيناريمول ، الفينبيروكسميت + الزيت المعدنى (ك – زد)، الفيناريمول + الكبريت، الزيت المعدنى (ك – زد) + المستخلص النباتىلبذورالفلفل الاسود والمستخلص النباتى لبذورالفلفل الاسود+ الكبريت.و لمعرفة أكثر المركبات تأثيراً على الأطوار المتحركة للعنكبوت الأحمر الذى يصيب نباتات الطماطم والفلفل والخيار تحت الصوب البلاستيكية حيث تم رش المركبات المختبرة بالجرعات الموصى بها حقلياً أوضحت النتائج أن كل المركبات المختبرة أدت إلى خفض تعداد الأطوار المتحركة للعنكبوت الأحمر خلال ٣ أيام الأولى منالمعاملة مع اختلاف نسب الخفض فى التعداد حسب نوع النبات المعامل و أن مركب الفينبيروكسميت والزيت المعدنى (ك-زد) أعطت تأثير متبقى عالى ضد الأطوار المتحركة للعنكبوت المختبر بينما انخفضت فاعلية مركبات الفيناريمول والكبريت والمستخلص النباتى للفلفل الأسود ضد هذه الأطوار بمرور الوقت بعد التطبيق و بدراسة التأثير السام المشترك لمخاليط المركبات المختبرة ضد الفطريات المختبرة معملياًإتضح أن معاملة واحدة فقط أحدثت تأثير "تنشيط" ضد فطر الريزوكتونيا سولانى وهى مخلوط مركب الفينبيركسميت + المستخلص النباتى لبذور الفلفل الأسود.وأن كل الخلائط المختبرة لم تظهر أى تأثير تقوية ضد فطر الفيوزاريوم مونيليفورم بل أحدثت تأثير تضاد فيما عدا معاملة واحدة فقط أحدثت تأثير إضافة وهى مخلوط الفينبيروكسميت + الكبريت.أظهرت النتائج أن مخاليط الفيناريمول + الفينبيروكسميت ، الفيناريمول + الزيت المعدنى (ك – زد) ، الفيناريمول + الكبريت، الفينبيروكسميت + الكبريت ، الكبريت + الزيت المعدنى (ك – زد) قد أحدثت تأثير "تضاد" ضد فطر الإلترناريا سولانى.

Table (2): Toxicity of tested compounds against *Rhizoctonia solani* , *Fusarium moniliforme and Alternaria solani under laboratory condations*

Compounds	*R. solani*				*F.moniliforme*				*A. solani*			
	IC_{50}	Confidence limits for LC_{50}		Slope	IC_{50}	Confidence limits for LC_{50}		Slope	IC_{50}	Confidence limits for LC_{50}		Slope
		Lower	Upper			Lower	Upper			Lower	Upper	
Fenarim-ol	2.6	1.61	3.66	0.96	0.34	0.16	0.60	0.59	0.71	0.4	1.1	0.64
Sulpher	13084.5	6669.65	56008.7	0.57	7959.5	6008.5	11557.5	1.32	11809.8	7160.4	23808.6	0.75
Fenpyre-ximate	162.4	102.7	280.8	1.43	593.5	461.04	788.9	1.04	101.9	67.7	167.99	0.48
KZ-oil	31855.4	17688.9	$1.35 X10^5$	1.73	5.09	56722	2.48×10^{12}	0.79	1.07×10^5	29926.6	2.19	0.75
Black pepper extract	309.46	235.44	41841	1.10	338.52	193.99	698.98	0.85	288.72	17104	622.4	0.87

Table (4) : Inhibition percent (I%) and Co-toxicity factor of compounds combinations (IC_{25} for each):

Fungi		Fenarimol + fenpyrox-imate	Fenarimol + kz-oil	Fenarimol + black pepper extract	Fenarimol + sulphur	Fenpyroxi -mate + kz-oil	Fenpyrox-imate + black extract	Fenpyr-oximate + suphur	Black pepper extract+ kz-oil	Black pepper extract + sulphur	Sulphur + kz-oil
R. solani	I%	48.5	48.9	43.3	32.6	21.11	60.8	40.2	55.6	43.89	44.4
	Co-Toxi.	-3	-2.22	-13.3	-34.72	-57.7	+21.6	-19.56	+11.11	-12.22	-11.11
F. moniliforme	I%	32.78	13.73	30.6	20.5	8.75	39.17	55.6	20.3	25	11.1
	Co-Toxi.	-34.4	-72.5	-38.9	-59.11	-82.5	-21.7	+11.11	-59.4	-50	-77.8
A. solani	I%	35	19.1	40	24.1	54.6	40.8	33.5	58.3	55	33.3
	Co-Toxi	-30	-61.9	-20	-51.9	+9.3	-18.4	-32.69	+16.7	+10	-33.4

N.B. used concentration of Kz-oil = 10^4 p.p.m