

THE TOXIC EFFECT OF SOME NATURAL-OIL; MINERAL-OIL AND MIXED SISI-6-OIL AGAINST THE CITRUS MEALY BUG *Plannococcus citri* (RISSE) (FAM: PSEUDOCOCCIGAE OR: HOMOPTERA)

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ABSTRACT

Laboratory experiment was conducted in Plant Protection Research Institute Agriculture Research Station Sabahia Alexandria. This study aimed to investigate the efficiency of some natural-oil and mineral-oil against *Plannococcus citri* (Risso). Also to study the effect of the same compounds with mixed sisi-6-oil against the citrus mealy bug, *plannococcus citri* (Risso). The results were recorded after 24, 48, 72 and 96 hours of treatment. The obtained data showed that the garlic-oil and neem-oil were the most toxic to the female of *Plannococcus citri*. The tested natural-oil had significant effect except the kz-oil on the *P. citri* 96hrs after treatment with the high dose (1.5ml.). The toxicity of tested materials and mixed sisi-6-oil were highly significant with more time and concentrations. However, garlic-oil with mixed sisi-6-oil was the most toxic after 96 hours of treatment against the citrus mealy bug at LC₅₀ level (0.449%), followed by onion +sisi-6-oil, neem+sisi-6-oil, citronella+sisi-6-oil and kz-oil+sisi-6-oil with LC₅₀ of 0.565, 0.571, 0.925 and 0.95%.

INTRODUCTION

The mealy bug *Plannococcus citri* (Risso) are considered of great important pests to the field vegetable crops, fruit tree, horticulture and ornamental plants, Mohammad and Nada (1993); El-Deeb (1999) and Fronteddu (2000). In Egypt, many problems have been encountered as result the extensive use of synthetic pesticides. Increasing problems concerning with the application of such insecticides including insecticide resistance, residual contamination of human foods mammalian toxicity and pollution of the environment, Yigit and Canhilal (1995); Miller and Uetz (1998); Gonzalez *et al* (2001) and Slime (2002). The present work aims to use selective safe substances (natural-oil) and kz-oil mineral oil for controlling the mealy bug, *Plannococcus citri* (Risso) and its effects with mixed sisi-6-oil on the same insect.

MATERIALS AND METHODS

The mealy bug *Plannococcus citri* (Risso) (PSEUDOCOCCIGAE: HOMOPTERA):

The mealy bug colonies were obtained from citrus trees plants from Alexandria Governorate and reared under laboratory conditions at 25±2°C and 75±5% RH on potato tubers.

Potato buds were sprayed with a series of the tested compound concentrations by micro manual atomizer to assure homogeneity spraying and replicated three times for each concentration, (0.5, 1.0 and 1.5%).

Ten adult females of *Plannococcus citri* were transferred individually from stock culture using affine –point prob .the tested materials were:

- *-Neem seed oil (Azadirachta indica A.Juss) oil, 0.3%.
- *-Garlic oil; onion oil and citronella oil, they were prepared as emulsifiable concentrate which contains 96% (v/v) base oil.
- *-kz oil produced by kafr El-ziat co. for pesticides and chemicals.
- *-Sisi-6 oil: local detergent prepared by Dr. A.G.El-sisi by neutralize at aryl alkyl sulfonate with sodium hydroxide solution.
- *-The same materials were mixture of sisi-6 oil against the mealy bug. Mortality was recorded after 24, 48, 72 and 96 hours post treatment.

Statistically analysis was conducted according to Finney (1971) and Abbott's (1925). The toxicity index (Ti) was determined by using Sun's equation (1950).

The combined action of the different mixtures was expressed as the co-toxicity factor which was estimated according to the equation given by (Mansour et al., 1996):

$$\text{Co-toxicity factor} = \frac{\text{Observed \% mortality} - \text{expected \% mortality}}{\text{expected \% mortality}} \times 100$$

This factor was used to differentiate the results into three categories:

- *-Potentiation (appositive factor of +20 or more).
- *-Antagonism (a negative factor of -20 or more).
- *-Additive (an intermediate values i . e. between + 20&-20).

RESULTS

The results show in Fig (1) indicate that the mortality percentage of the mealy bug *Plannococcus citri* was, significantly different after 24 hour from the treatment which recorded, 46.67; 40, 38.33, 31.67 and 16.67% at 1.5% concentration for garlic oil, neem oil, citronella oil, onion oil and kz oil respectively. While mortality percentage of *Plannococcus citri* after 48 hour at (1.5%) reduced to reach, 70, 63.33, 60, 43.33 and 25% for garlic oil, neem oil, onion oil, citronella oil and kz oil, respectively.

However, the reduction of mealy bug, *Plannococcus citri* after 72 hour from treatment were 81.67, 76.67, 73.33, 50.6 and 33.33% at (1.5%) concentration for garlic oil, neem oil, onion oil, garlic oil, neem oil, onion oil, citronella oil and kz oil, respectively.

Results showed the lowest mortality rate recorded on mealy bug, *Plannococcus citri* after 24 hour from treatment were 11.67, 10, 10.5 and 1.67%, at (0.5%) concentration for neem oil, garlic oil, onion oil, kz oil, and citronella oil, respectively.

The highest mortality rate observed after 96 hour from treatment with natural oil (garlic oil, neem oil, onion oil and citronella oil) against *Plannococcus citri* were 93.33, 88.33, 81.67 and 61.67% respectively at (1.5%) concentration.

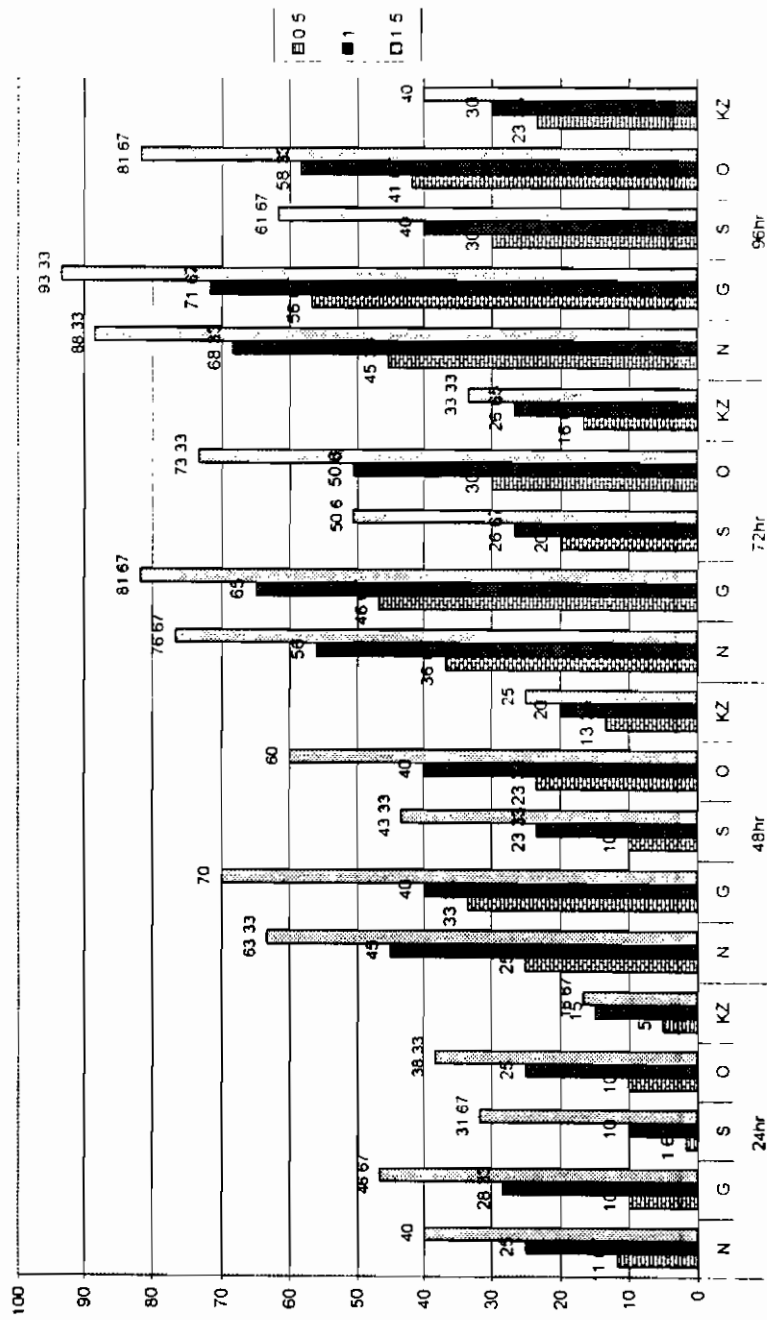


Fig.(1): Corrected mortality % of the citrus mealy bug *Plumatococcus citri* treated with three concentrations of some natural oil and one mineral oil (Kz).

The lowest mortality rate observed 96 hour after treatment with mineral oil (kz oil) against *Plannococcus citrs* was 40% and 23.33%, respectively at (1.5% 0.5%) concentration.

Data in Fig (2) showed that the efficiency of the natural oil and mixtures Sisi-6 oil to adult female of *Plannococcus citri* after 24, 48, 72 and 96 hours.

The mortality percentage of garlic oil and mixtures Sisi-6 oil recorded after 24 hours was 48.33 % at concentration (1.5%) and 11.67% at concentration (0.5%).

Citronella oil and mixtures Sisi-6 oil recorded mortality rate 35% and 6.67% at concentration (1.5%) and 0.5%, neem oil and mixtures Sisi-6 oil recorded 40% and 15%, onion oil and mixtures Sisi-6 oil recorded 41.67% and 16.67% concentration (1.5%) and (0.5%). kz oil and mixtures Sisi-6 oil recorded mortality rate 28.33% and 5% concentration (1.5%) and (0.5%).

After 48 hours in case of Citronella oil and mixtures Sisi-6 oil the mortality percentage was ranged from 13.33% by using the lowest concentration on (0.5%) to 46% when using the highest concentration (1.5%). In case of neem oil and mixtures Sisi-6 and onion oil and mixtures Sisi-6 oil, mortality percentage ranged from 5% to 30% and 63.33% to 60% at (0.5 % and 2.0%), respectively. mineral oil kz oil and mixtures Sisi-6 oil recorded mortality percentage from 11.65% to 45% at concentration (0.5% and 1.5%), respectively. Garlic oil and mixtures Sisi-6 oil, recorded mortality percentage ranged from 33.33% to 71.67% at concentration (0.5% and 1.5%), respectively.

After 72 hours in cases of Citronella oil and mixtures Sisi-6 oil and garlic oil and mixtures Sisi-6 oil recorded mortality percentage from 21.67% to 48.33% and 51.67% to 86.67% at (0.5 % and 1.5%), respectively .

After 96 hours in cases of Citronella oil and mixtures Sisi-6 oil and garlic oil and mixtures Sisi-6 oil; mineral oil kz oil and mixtures Sisi-6 oil; onion oil and mixtures Sisi-6 oil; neem oil and mixtures Sisi-6 and garlic oil and mixtures Sisi-6 oil recorded mortality percentage ranged from 6.67% to 58.33% and 71.67% to 96.67% at (0.5 % and 1.5%) respectively.

Data in Table (1) showed the efficiency of the natural oil and mineral oil against the mealy bug *Plannococcus citri*. Garlic oil was the most toxic to adult females of *P. citri* with LC_{50} : 1.644 and LC_{90} : 5.318, while LC_{50} of Citronella oil, Neem oil and Onion oil were 2.074, 2.083 and 2.1ml, respectively. Mineral oil recorded LC_{50} and LC_{90} : 6.635 and 54.835 respectively. Also showed the toxicity index (Ti=100) at LC_{50} and LC_{90} which were: 100 % and 86.72 % for garlic oil, respectively, while Citronella oil recorded 79.267, 100 % , Mineral oil toxicity index recorded 6.635 and 54.835% at LC_{50} and LC_{90} after 24 hr. respectively.

In the same table, data showed that the LC_{50} and LC_{90} after 48, 72, 96 hr., the garlic oil was the most toxic of the mealy bug *Plannococcus citri* followed by , Neem oil , Onion oil and Citronella oil, respectively.

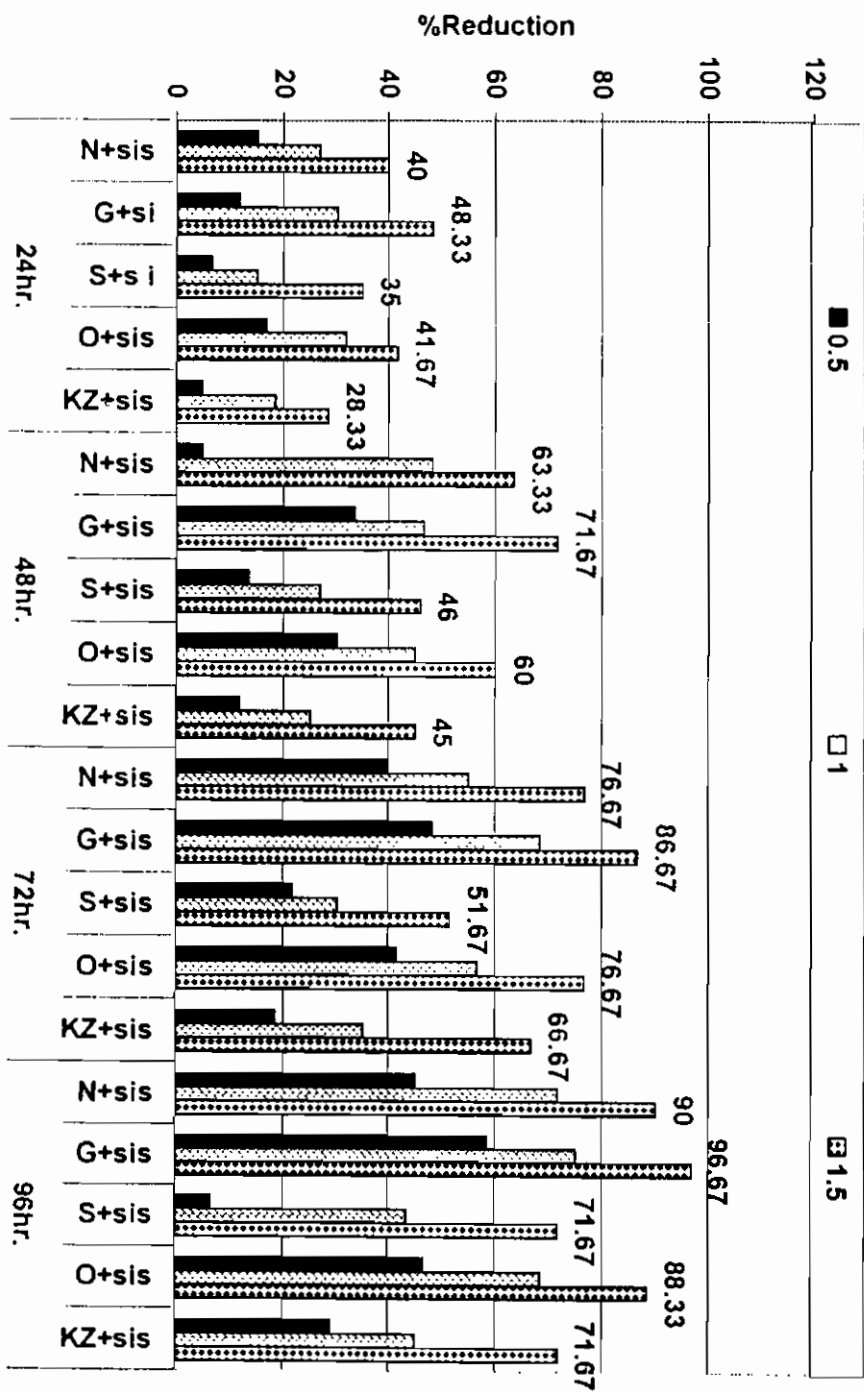


Fig. (2): Corrected mortality % of the citrus mealy bug *Planococcus citri* (Risso) treated with three concentrations of some natural oil and some mineral oil (Kz-oil) with mixtures sisf-6 oil.

Table (1): Efficiency of some the natural's oil and mineral oil against adult females of mealy bug, *Plannococcus citrs* 24, 48,72and96 hr. after treatment at 25±2°C and 75±5% RH.

Treatment	Conc.	24 hr.		48 hr.		72 hr.		96 hr.	
		Corrected mortality %	LC ₅₀	Corrected mortality %	LC ₅₀	Corrected mortality %	LC ₅₀	Corrected mortality %	LC ₅₀
Neem oil	0.5	11.67	2.083	25	1.082	36	0.761	43.33	0.598
	1.0	25		45		56		68.33	
	1.5	40		63.33		76.67		88.33	
Garlic oil	0.5	10	1.644	33.33	0.979	46	0.573	56.67	0.457
	1.0	28.33		40		65		71.67	
	1.5	46.67		70		82.67		93.33	
Citronella oil	0.5	1.67	2.074	10	1.861	20	9.48	30	1.141
	1.0	10		23.33		26.33		40	
	1.5	31.67		43.33		50.67		61.67	
Onion oil	0.5	10	2.1	23.33	1.201	30	3.15	41.67	0.668
	1.0	25		40		50		58.33	
	1.5	38.33		60		73.33		81.67	
Kz-oil	0.5	5	6.635	13.35	8.275	16.67	49.81	23.33	2.989
	1.0	15		20		26.65		30	
	1.5	16.67		25		33.33		40	

The slope value in our consideration, the highest value was 3.692 and 2.341 for Citronella oil followed by garlic oil, Onion oil and Neem oil, which recorded 2.514, 1.841; 2.019; 2.063 and, 1.964, 2.084 respectively, while kz- oil recorded 1.397, 0.912 after 24 hr. and 48hr. while The slope value indicated that, Onion oil and Neem oil had the highest value 2.322 and 2.692 while kz- oil recorded the lowest value 1.124 and 0.97, after 72 and 96.

Data in Table (2) showed the efficiency of the natural oil and mineral oil with mixtures sisi-6 oil against the mealy bug *Plannococcus citrs*. Garlic oil +mixtures sisi-6 oil was the most toxic to adult females of *P. citrs* with LC₅₀ 1.593and LC₉₀:5.425, while LC₅₀ of Onion oil + mixtures sisi-6 oil, Neem oil+ mixtures sisi-6 oil and Citronella oil+ mixtures sisi-6 oil were2.021, 2.236 and 2.33ml, respectively.

Table (2): Efficiency of some the natural's oil and mineral oil mixed with sisi-6-oil against adult females of mealy bug, *Plannococcus citrs* 24, 48,72and96 hr. after treatment at 25±2°C and 75±5% RH.

Treatment	Conc.	24 hr.		48 hr.		72 hr.		96 hr.	
		Corrected mortality %	LC ₅₀	Corrected mortality %	LC ₅₀	Corrected mortality %	LC ₅₀	Corrected mortality %	LC ₅₀
Garlic+Sisi-6-oil	0.5	11.67	1.593	33.33	0.894	48.33	0.544	58.33	0.449
	1.0	30		46.67		68.33		75	
	1.5	48.33		71.67		86.67		96.67	
Onion+ Sisi6-oil	0.5	16.67	2.021	30	1.1	41.67	0.689	46.67	0.564
	1.0	31.67		45		56.67		68.33	
	1.5	41.67		60		76.67		88.33	
Neem+ Sisi6-oil	0.5	15	2.236	5	1.146	40	0.722	45	0.571
	1.0	28.67		48.33		55		71.67	
	1.5	40		63.33		76.67		90	
Citronella+ Sisi6-oil	0.5	6.67	2.33	13.33	1.746	18.33	1.165	6.67	0.925
	1.0	15		26.67		35		43.33	
	1.5	35		46		66.67		71.67	
Kz-oil+ Sisi6-oil	0.5	5	2.653	11.65	1.806	21.67	1.624	28.83	0.95
	1.0	18.33		25		30		45	
	1.5	28.33		45		51.67		71.67	

Mineral oil+ mixtures sisi-6 oil recorded LC₅₀ and LC₉₀:2.653 and 9.99 respectively. Also showed the toxicity index (Ti=100) at LC₅₀ and LC₉₀ which were: 100 % and 100 % for garlic oil + mixtures sisi-6 oil, respectively, while Onion oil + mixtures sisi-6 oil recorded 78.82, 41.79% , Mineral oil + mixtures sisi-6 oil toxicity index recorded 60.04 and 54.3 % at LC₅₀ and LC₉₀ after 24 hr respectively.

In the same table, data showed that the LC₅₀ and LC₉₀ after 48, 72, 96 hr., the garlic oil+ mixtures sisi-6 oil was the most toxic of the mealy bug *Plannococcus citrs*, followed by , Onion oil+ mixtures sisi-6 oil, Neem oil + mixtures sisi-6 oil, and Citronella oil + mixtures sisi-6 oil, respectively.

The slope value in our consideration, the highest value was 2.409 and 4.039 for garlic oil+ sisi-6 oil and Neem oil+ mixtures sisi-6 followed by, Citronella oil + mixtures sisi-6 oil and Onion oil+ mixtures sisi-6 oil, which recorded,2.395, 2.143and1.586, 1.599 respectively, while kz- oil recorded2.225, 2.234after 24 hr. and 48hr. while The slope value indicated that, Neem oil+ mixtures sisi-6 and garlic oil+ sisi-6 oil had the highest value 2.79 and 2.72 while Citronella oil + mixtures sisi-6 oil recorded the lowest value 1.674 and 1.957, after 72 and 96hr. Co-toxicity resulted from addition of sisi-6-oil at its (0.5, 1.0, 1.5ml.) dose to the natural oil and mineral oil (kz) against the mealy bug *P. citri* in tables (3, 4, 5,6).Results showed that the antagonism of sisi-6-oil to the natural oil or mineral oil at the three concentrations increased its effects than separately. The calculated joint action was found to be antagonism effect in 0.5;1.0 and 1.5 ml. concentration with the mixtures neem, citronella and mineral oil ,after 24 hr. from treatment in table (3).

Table (3): Co toxicity resulted from addition of Sisi-6-oil at the three dose to natural's oil and mineral oil at 25±2°C and 75±5% RH.

Treatment	Conc.	% Mortality after 24 hr.from treatment.				Type of action	Co-toxicity
		Sisi-6-oil	Oil alone	Total	Oil+Sisi-6-oil		
Neem	0.5	12.2	11.67	23.87	15	-33.51	antagonism
	1.0	18.3	15	33.3	26.67	-20	antagonism
	1.5	23.76	40	63.76	40	-37.3	antagonism
Garlic	0.5		10	22.2	11.67	-47.4	antagonism
	1.0		28.33	46.63	30	-35.6	antagonism
	1.5		46.67	70	48.3	-31	antagonism
Onion	0.5		10	22.2	16.67	-24.9	antagonism
	1.0		25	43.3	31.67	-26.8	antagonism
	1.5		38.3	62.06	41.67	-32.8	antagonism
Citronella	0.5		1.67	13.87	6.67	-51.9	antagonism
	1.0		10	28.3	15	-46.9	antagonism
	1.5		31.67	55.43	35	-36.8	antagonism
Kz	0.5		5	17.2	5	-29.4	antagonism
	1.0		15	33.3	18.33	-45	antagonism
	1.5		16.67	40.43	28.33	-29.9	antagonism

After 48hr. calculated joint action was found to be potentiation effect in 0.5 ml. concentration with neem, while all mixtures and mineral oil were found to be antagonism effect in 0.5 1.0,1.5 ml, concentration in table(4). The result indicate Cleary that the combinations were additive effective in garlic and onion+sisi-6-oil with 0.5;1 and 1.5 ml. concentration in table(5).While the calculated joint action was found to be an additive effect in all mixtures expected mineral oil was Potentiation effect in1.5 ml. concentration in table (6).

Table (4): Co toxicity resulted from addition of Sisi-6-oil at the three dose to natural's oil and mineral oil at 25±2°C and 75±5% RH.

Treatment	Conc.	% Mortality after 48 hr.from treatment.			Co-toxicity	Type of action.
		Sisi-6-oil	Oil alone	Oil+Sisi-6-oil		
Neem	0.5	13.9	5	25	+32.2	Potentiation.
	1.0	20.9	25	48.33	+5.29	Additive.
	1.5	25.9	63.33	63.33	-29.0	Antagonism-
Garlic	0.5		33.33	33.33	-29.4-	Antagonism -
	1.0		40	46.67	-23.3	Antagonism
	1.5		70	71.67	-25.2	Antagonism
Onion	0.5		23.33	30	-19.4	Additive
	1.0		40	45	-26.1	Antagonism
	1.5		60	60	-30.1	Antagonism -
Citronella	0.5		10	13.33	-44.2	Antagonism
	1.0		23.33	26.67	-39.8	Antagonism
	1.5		43.33	46	-33.65	Antagonism
Kz	0.5		11.65	13.35	-47.7	Antagonism
	1.0		20	25	-38.8	Antagonism
	1.5		25	45	-11.59	Additive

Table (5): Co toxicity resulted from addition of Sisi-6-oil at the three dose to natural's oil and mineral oil at 25±2°C and 75±5% RH.

Treatment	Conc.	% Mortality after 72hr.from treatment.			Co-toxicity	Type of action.
		Sisi-6-oil	Oil alone	Oil+Sisi-6-oil		
Neem	0.5	13	36	40	-18.36	Additive.
	1.0	21	53	56	-24.3	antagonism
	1.5	25.7	76.67	76.67	-25.05	antagonism
Garlic	0.5		46	48.33	-18.08.	Additive
	1.0		65	68.33	-20.	Additive.
	1.5		81.67	86.67	-19.2	Additive.
Onion	0.5		30	41.67	-3.09	Additive.
	1.0		50	56.67	-20	Additive.
	1.5		73.33	76.67	-22.5.	Antagonism
Citronella	0.5		20	21.67	-34	Antagonism.
	1.0		26.33	30	-36.6	Antagonism.
	1.5		50.6	51.67	-32.2	Antagonism.
Kz	0.5		16.67	18.33	-38.2	Antagonism.
	1.0		26.65	35	-26.5	Antagonism.
	1.5		33.33	66.67	+12.9	Additive

Table (6): Co toxicity resulted from addition of Sisi-6-oil at the three Dose to the natural's oil and mineral oil at 25±2°C and 75±5% RH.

Treatment	Conc.	% Mortality after 96 hr. from treatment.			Co-toxicity	Type of action.
		Sisi-6-oil	Oil alone	Oil+Sisi-6-oil		
Neem	0.5	5	43.33	45	-6.8.	Additive.
	1.0	9.9	68.33	71.67	-8.3	Additive.
	1.5	5	88.33	90	-3.5	Additive.
Garlic	0.5		56.67	58.33	-5.4	Additive.
	1.0		71.67	75	-8.05.	Additive.
	1.5		93.33	96.6	-1.7	Additive.
Onion	0.5		43.67	46.67	-4.1	Additive.
	1.0		58.33	68.33	-0.16	Additive.
	1.5		81.67	88.33	+1.9	Additive.
Citronella	0.5		6.67	30	+15.7	Additive.
	1.0		40	43.33	-13.1	Additive.
	1.5		61.67	71.67	-7.4.	Additive.
Kz	0.5		23.33	28.83	+1.7	Additive.
	1.0		30	45	+12.7	Additive.
	1.5		40	71.67	+59.2	Potentialion.

DISCUSSION

The present study deals with toxicological effects of some natural oil (garlic oil, onion oil, neem oil, citronella oil and mineral oil) and with mixtures sisi 6 oil were tested against the mealy bug *Plannococcu citrs* (Risso). Many investigators proved that, they were effective natural oil against insects tested in laboratory Abbassy *et al.* (1998), Abd El-Wahab (2003) and Aranda(2005).

The results revealed that, the garlic oil was the most toxic Natural oil to adult females of the mealy bug *Plannococcus citrs* followed by neem oil and onion oil. Natural oil with mixtures sisi-6 oil and mineral oil + mixtures sisi-6 oil were recorded the most toxic after 48, 72, 96 hr. These results are in agreement with the findings of Mohamed (1997).

The lowest mortality recorded on the mealy bug *Plannococcus citrs* (Risso) on garlic oil and garlic oil +mixtures sisi- 6 oil. These results agree with the finding of El- Lakwah *et al.* (1996).

The high concentration of the natural oil had a significant effect and resulted in a high percentage of mortality which agrees with the findings of Abd El-Wahab (2003), while there was no effect of all natural oil+sisi -6 oil and after 24and 48 hr. from the treatment. All tested natural oil + sisi -6 oil after 72 and 96 hr. from the treatment were more toxic to the mealy bug *Plannococcus citrs*. Thesis results similar with those founded by Shalan (1998), Shalaby (2004). The joint action resulted from the mixtures of the natural oil plus sisi-6-oil against the mealy bug additive and antagonism effect in all cases. Also, the obtained result coincides with findings of other investigators (El-lakwah et al 1996; Mohamed 1997; Shaalan 1998 and Shalaby 2004).

REFERENCES

- Abbassy, M. A.; El-Gougray, O. A.; El-Hamady, S. and Sholo, M. A. (1998): Insecticidal, acaricidal and synergistic effects of soosan *Pancreaticum maritimum*, extracts and constituents. J. Egypt. Soc. Para., 28 (1): 197-205.
- Abbott's, W. S. (1925): A methods for computing the effectiveness of an insecticide. J. Econ. Entomol. 18 (7): 265.
- Abd El-Wahab, H. A. (2003): Efficiency of leaves extracts of castor bean plant against *Aphis gossypii* (Glover) and *Tetranychus urticae* Koch on cucumber plant. J. Agric. Sc., Mansoura Univ., 28 (5): 4029-4038.
- Arand, B.J.M.(2005): New botanical insecticides, obtained from weeds Coccoidea control. Cuadernos de fitopatologia (España) (no. 83) p. 11-15.
- El-Deeb, M.F.(1999): Evaluation of some local spray oils and Bio-Insecticides for the control of citrus white flies and Mealy bug on citrus trees. J. pest cont. Environ. sci. 7(3): 15-
- EL -Lakwah, F. A.; Hamed, m.s. and Abdel-latif, A.M.(1996): Effectiveness of lantana camar and Nerium oleander extracts alone and mixtures with tow insecticides against Rizopertha Dominica (F) Annals of Agric. Sc. Moshtohor 34(4)1879-1905.
- Finney, D.J. (1952): Probit analysis (Second Edition) Cambridge Univ. Press, London, pp1-661.
- Fronteddu, F.; Basoni, p.; Cann, D.; Fancello, p. and Nanni, G. (2000): Results of four years of observations concerning biological control of *plannococcus citrs* (Risso) in citrus. Groves in Eastern Sardinia Attidelle- Giornate-Fitopatologiche (Italy) .p.387-394.
- Gommaa, E.M.; M.F.; El-Deeb, K.S.M. and youssef K.H.(1995): Studies on the effect of some local mineral oils alone and in mixtures with Malathion on olive tree scale, Leucaspis rice Targ. J. Agric. Sci. Mansoura univ. vol.20 (9), 4151-4
- Gonzalez, R.H.; Poblete, G.J. and Barria, G.(2001): Tree fruit mealy bug in chile, pseudococcus viburni(signoret) Revista-Fruticola (chile).V.22(1)p.17-26.
- Miller, F. and Vetz, S.(1998): Evaluating bioregional pesticides for controlling arthropod pests and their phytotoxic effects on green house crops. Hortechonology (USA).V.8 (2) p 185-192.
- Mansour, N.A.; El-Defrawi, M.E.; Topozada, A. and Zeid, M.(1966): Toxicological studies on the Egyptian cotton leaf worm, *Prodenia lituræ* potentiaon and antagonism of organophosphorus and carbamate insecticides. J. Econ. Entomol., 59:357-361.
- Mohamed, R.A. 1997): Effectiveness of datura leaves extracts and their mixtures with Malathion against the cowpea beetle *Callosobruchus maculatus* (F.) Annals of Agric. Sc Moshtohor, 35(1):589-604.
- Mohamed, K.Z. and Nada, M.A.S.(1995): The Pseudococcidae of Egypt (Coccidea: homoptera). Egypt. J. Agric. Res. 73(3), 607-637.

- Selim,A.A.M. (2002):Integrated control of scale insects on certain fruit trees. Ph.D,Thesis, Fac. Agric.,Al-Azhar ,Univ.226 pp.
- Shalaan,H.S.(1998):Studies on the efficiency of some plant products as protectants against pests of cabbage crop. Ms. Thesis, Fac. Agric. Moshtohor, Banha, Univ.103pp.
- Shalaby, H.H. (2004): Studies on the efficiency of some new pest control measures against certain pests of common bean.Ph.D.Thesis, Fac.Agric. Moshtohor, Banha, Univ.357 pp.
- Yigi,A.and Canhital,R.(1995):Introduction into East Moediterranean region of cold- tolerant bioty pes of the citrus mealy bug predator, *Cryptolaemns montrouzieeri* Muls.and its adaptation to the region. Adana (Turkey). Plant protection Research Inst., 22
- Sun, Y. P. (1950): Toxicity index an improved method of comparing the relative toxicity of insecticides. J. Econ. Entomol., 43: 45-53.

تأثير سمية بعض الزيوت الطبيعية والزيوت المعدنية KZ ضد بق الموالح لدقيقى

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أجريت تجربة معملية في معامل معهد بحوث وقاية النباتات بمحطة الصبحة الاسكندرية لدراسة فاعلية بعض الزيوت الطبيعية (زيت الثوم وزيت البصل وزيت السترونيللا وزيت النيم) ضد بق الموالح لدقيقى مع عمل مقارنة باستخدام الزيت المعدنى KZ وأخذت النتائج بعد ٢٤ ساعة، ٤٨ ساعة أيام، ٧٢ ساعة، ٩٦ ساعة بعد المعاملة. أوضحت النتائج أن:

- (١) أعلى تأثير إبادة زيت الثوم وزيت النيم ضد أنثى بق الموالح لدقيقى بعد ٢٤ ساعة من المعاملة.
- (٢) وبعد ٤٨، ٧٢، ٩٦ ساعة بعد المعاملة كانت اعلى نسبة إبادة لزيت الثوم وزيت النيم يليه زيت البصل ضد أنثى بق الموالح لدقيقى .
- (٣) وأيضا أظهرت النتائج أن الزيوت الطبيعية لها تأثير معنوى ما عدا الزيت المعدنى KZ ضد أنثى بق الموالح لدقيقى بعد ٩٦ ساعة من المعاملة مع التركيز العالى ١.٥.
- (٤) تأثير السمية للزيوت الطبيعية السابقة والزيت المعدنى مع الخلط مع زيت السيسى ٦، قد تبين من النتائج أعلى إبادة معنوية مع التركيز العالى ضد أنثى بق الموالح لدقيقى. وقد تبين من النتائج السابقة زيت الثوم مع الخلط مع زيت السيسى ٦ أعلى نسبة إبادة بعد ٩٦ ساعة من المعاملة ضد أنثى بق الموالح لدقيقى و كان لزيت الثوم مع الخلط مع زيت السيسى ٦ أعلى تأثير سام ضد أنثى بق الموالح لدقيقى ($LC_{50} = 0.449$) يليه فى السمية زيت البصل وزيت النيم وزيت السترونيللا ثم زيت المعدنى مع الخلط مع زيت السيسى مع السيسى مع LC_{50} تعادل 0.449,0.564,0.571,0.925

