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EVALUATION OF FOUR NEW DEVELOPED COMPOUNDS UPON THE LEAF MINER AND TWO SPIDER MITE SPECIES ON CANTALOUPE PLANTS, IN NOBARIEA REGION, BEHAIRA GOVERNORATE, EGYPT

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ABSTRACT: *A field study was conducted at the Agriculture Experimental Farm of El- Nobaria Research Station, El-Behaira Governorate, in seasons of 2005 and 2006. Two chemical compounds were evaluated for controlling the leaf miners and spider mites on cantaloupe plants, i.e, thiamethoxam (Actara®) , and pymetrozine (Chess®) , besides two plant natural products – azadirachtin (Achook®) and soybean oil (Natural oil®) . In seasons 2005 and 2006, most of the evaluated compounds were found to have a comparative less toxic effect against the leaf miners. Azadirachtin was relatively the efficient against the treated insect –pest (73.67 % at the 7th day with an average rate of reduction comprised 56.54 %) followed by the other tested compounds: soyabean (Natural oil®) , pymetrozine (Chess®) and the least effective one thiamethoxam (Actara®). The less efficient compounds - thiamethoxam (Actara®) and soyabean oil (Natural oil®) gave the same rate of reduction (38.39 and 37.88 %), respectively. Also for both the inspected spider mites Tetranychus urticae (Koch) and Tetranychus cinabarinus (Boisd)in seasons 2005&2006, soyabean oil (Natural oil®) was found to be the most effective compound among all the performed treatments followed by Azadirachtin (Achook®) and the less efficient thiamethoxam (Actara®) and pymetrozine (Chess®).*

Key words: *Actara®, Chess®, Achook® and Natural oil.*

INTRODUCTION

Cantaloupe plant, *Cucumis melo* (Family: Cucurbitaceae) is one of the most important economic cucurbitaceae vegetables cultivated in Egypt , in both the open field and greenhouses agro-ecosystem. It is considered to be one of important summer vegetable crops for local market and exportation. Therefore, in recent time, the cultivated area with cantaloupe is increased especially in the new reclaimed areas. Cantaloupe plants are liable to infestation by many phytophagous pests of which the sap-sucking ones and also the leaf miners (*Liriomyza spp.*) are considered the most common important economic pests. The red spider-mite *T. urticae* causes serious

damage to plants leading to great reduction in the final yield. Leaf miners the phytophagous insect pests world wide cause economic damage to vegetable and ornamental crops. The larvae feed in the leaf mesophyll tissue and form a serpentine mine; thereby reducing the photosynthetic capacity of leaves (Zhao and Kang, 2003). The leaf miners begin to damage the host plant as soon as their eggs hatch. Leaf miners may prevent young leaves from expanding after the miner has finished feeding. Also, *Tetranychus spp* are the economic injurious spider mites that attack a range of vegetables and fruit crops .Spider mites significantly affects the quality and yield of infested host plants. So, a new line of pesticides and bio-pesticides are being developed, besides the intensive research works devoted to evaluate the naturally occurring chemical phytocompounds against suck-pests .Three products can be used to control many of them and would be safe for farmers, domestic animals and the environment without causing any drastic side effects upon the beneficial insects (Stepnens, 1997).

Amongst, thiamethoxam (Actara®) has been used for controlling aphids, whitefly, thrips , rice-hoppers, mealy-bugs, white grubs, Colorado potato beetles, flea beetles, wire worms, ground beetles, leaf miners and some lepidopterous species.

Pymetrozine (Chess®) is an insecticide with a new mode of action, representing a novel type of chemistry (pyridine azomethines). It is highly active against susceptible and resistant aphids and whiteflies in vegetables and other crops, the compound has a low acute toxicity to mammals as well as terrestrial and aquatic organisms, and favorable ecochemical properties, which makes it suitable for IPM programmer.

Neem has gained increasing attention as a natural insecticides and its activity has been evaluated against many economically important insect species (Schmutterer, 1990). Neem has deterrent, anti-ovipositional, antifeedant, growth disrupting (growth regulating), fecundity – and fitness-reducing properties on insect (Mordue and Blackwell, 1993).

On the other hand, their are a few researches used the soyabean oil Natural oil ® for controlling the piercing and sucking insect-pests (Butler and Henneberry, 1999; El-Sebae *et al.*, 1997; Amer *et al.*, 2001; Paula and Bleicher, 2003). Therefore, the present work has been conducted as an attempt to suggeste some possible new approaches in the (IPM) to control and prevent the probably occurring damage of these previously mentioned pests on growing cantaloupes under the prevailing conditions in open field and protected cultivations.

MATERIALS AND METHODS

Field experiments in summer seasons of 2005 and 2006.

For performing the summer field experiments, an area of about 300 m^2 was chosen, at Nubaria Experimental Farm, which has been divided into

plots each of about 24 m^2 (6 x 4 m). Seeds were sown at a distance of 40-50 cm between hills in beds 1 m in width; 60 cm apart inbetween. The germinated plants were arranged in one row along the bed. Thereafter, the growing plants were kept under low tunnels. The experimental procedure and treatmental schedules were carried out according to the usual and recommended normal agriculture practices.

Field trials were conducted for studying the occurring of whitefly pests on growing cantaloupe plants, (*Cucumis melo* L., var. *Ananas dokki*) during the consequent summer seasons of 2005 and 2006 at the Agricultural Experimental Farm of Nubaria Station, El-Behaira Governorate.

Chemicas used:

Thiamethoxam (Actara® 25 % WG), Pymetrozine (Chess ® 25% WG) , Azadirachtin (Achook® 0.15% EC) and Natural oil® (Soybean oils 93% L).

Field trials:

The evaluated four chemical compounds and used rates/fed. during the growing seasons of 2005, 2006 are exhibited in Table 1 . Field application of each tested chemical were performed for measuring their efficiency against the main dipterous leafminer, *L. bryoniae* and the spider mites *T. cinnabarinus* and *T. uritica* infesting cantaloupe plants, All the tested four compounds were recommended and supplied by Ministry of Agriculture and Cairo chemical Company to be applied against these target pests. Treatments were applied in complete randomized block design with three replicates for each, and the untreated control. To evaluate the effect of pesticides foliar sprays on the incidence of infestations by pests populations, plants were sprayed with each of those tested compounds for determining to what extent they might be included in the IPM program for cantaloupe plants. In summer cultivation of cantaloupe, plants received just one spray application at the end of the season. Application was made using Knapsack sprayer (20L), concentrations were calculated at the rate of the use of 400 L water /fed. Control plants were chosen amongest those ones faraway from tested plants in different conducted treatments to avoid any contamination or interference of spray drift.

Sampling technique and insect inspection

The inspected individuals of occurring pests on cantaloupe plants during the period of 2005 and 2006 seasons were counted and recorded to be as an indicator to the effectiveness of each of the involved compounds in the test. Inspections of treated plants were carried out before and after treatment by 0,2,5,7,10 days post spraying ; for the occurring individuals of leafminers and 0,2,5,7,10 and 17 days post treatment for the occurring individuals of spider mites, which counted on ten randomize chosen plants per replicate.

Whereas, 30 leaves were picked at random from the Canopy (lower, medium and upper part) of each plant for counting the number of living pest's individuals post each treatmental periods, the sampled leaves were put in plastic sacs, transferred to the laboratory, and examined under stereoscopic binocular microscope .

Table (1). Pesticides and their used doses in the present study during 2005 and 2006 seasons.

No.	Trade name	Concentration of A.I. (%)	F.	Common name	Application rate
1	Actara®	25.00	WG	Thiamethoxan	80 g/fed.
2	Chess®	25.00	WG	Pymetrozine	80 g/fed.
3	Achook®	0.18	EC	Azadirachtin	750 ml/fed.
4	Natural oil®	93.00	EC	Soyabean oil	625 ml/fed.

A.I.: Active ingredient
F : Formulation
WG : Granules or tablets, water dispersible.
EC : Emulsifiable concentration

Calculation of infestation reduction

Post treatmental applications, the percentages of infestation reduction were calculated according to Handerson and Tilton's equation (1955) as follows:

$$\text{Reduction \%} = \left[1 - \frac{a}{b} \times \frac{c}{d}\right] \times 100$$

Where:

a : population in treatment after spraying
b : population in treatment before spraying
c : population in check untreated (control) before spraying
d : population in check untreated (control) after spraying

Statistical analysis

Data were subjected to the analysis of variance ANOVA test and complete Randomized Block Design (F-test), the least significant differences (LSD) at the 5% level were determined according to computer program-Costat and Duncan's Multiple Range Testes modified by Steel and Torrie (1981); and used to compare the average numbers of different inspected pests.

RESULTS AND DISCUSSION

Effect of tested chemical and essential oils against the leaf miners infesting cantaloupe plants under low tunnels in 2005 and 2006 seasons.

It is worth to mention here the occurred infestation by leaf miners was patent and observed after 65 days from sowing date till the end of the growing season of cantaloupe plants.

The presented results in Tables 2 and 3 exhibit the calculated percentages of reduced numbers of leaf miner after the performance of 2nd spray of tested chemicals on cantaloupe plants during the consequent summer seasons of 2005 and 2006.

From Table 2, it could be revealed that the evaluated chemicals gave variable percentages of reduced leaf miners numbers on the inspected cantaloupe plants post-treatment. Most of the evaluated chemicals were found to have a comparative less toxic effect on leaf miners. Whereas, the relative lower efficiency of each was detected from the 2nd day post-application till the 7th day; and the period of relative efficient reduction extended along the 2nd up to the 7th day on the treated plants, except for azadirachtin (Achook®) which lasted till the 10th day. In this concern, azadirachtin was efficient against the treated insect-pest (73.67% at the 7th day), compared to the other three tested compounds which indicated lower efficiency at the same period amounted to 49.16%, 46.79% and 47.35% for thiamethoxam (Actara®), pymetrozine (Chess®) and soyabean oil (Natural oil®), in respect. Later, these calculated percentages of insects reduction were more decreased up to 35.90, 41.48, 61.82 and 33.61% on the 10th day from treatment for thiamethoxam (Actara®), pymetrozine (Chess®), azadirachtin (Achook®) and soyabean oil (Natural oil®), consequently.

Table (2). The calculated percentages of reduction of the inspected leafminers after 2nd application of tested chemicals on cantaloupe plants (season 2005).

Treatment	% of reduction					
		Inspection period (days)				
	No. of individuals pre-spray	2	5	7	10	General Mean
Thiamethoxam (Actara®)	87	24.37	46.14	49.16	35.90	38.89^{c}
Pymetrozine (Chess®)	71	51.65	59.38	46.79	41.48	49.83^{b}
Azadirachtin (Achook®)	63	36.43	54.22	73.67	61.82	56.54^{a}
Soyabean oil (Natural oil®)	56	28.48	42.07	47.35	33.61	37.88^{c}
Control	82	--	--	--	--	--
General mean	--	35.23^{d}	50.45^{b}	54.24^{a}	43.20^{c}	--
$LSD_{0.05}$		$^{(B)}$1.887			$^{(A)}$1.887**	

* Means followed with same letter (s) are not significantly different.
**(A)=$LSD_{0.05}$ between treatments (Pesticides), and (B)=$LSD_{0.05}$ between intervals(time)

Table (3). The estimated percentages of reduction of occurring leafminer after 2nd spraying of evaluated chemicals on cantaloupe plants (season 2006).

Treatment	% of reduction					
	Inspection period (days)					
	No. of individuals pre-spray	2	5	7	10	General Mean
Thiamethoxam (Actara®)	81	22.62	41.28	31.33	12.28	26.88^{d*}
Pymetrozine (Chess®)	81	40.16	51.75	48.14	30.00	42.51^{c}
Azadirachtin (Achook®)	89	39.97	64.51	61.17	64.51	57.42^{a}
Soyabean oil(Natural oil®)	62	42.00	69.02	51.06	31.55	48.41^{b}
Control	75	--	--	--	--	--
General mean	--	36.19^{c}	56.52^{a}	47.93^{b}	34.59^{c}	--
$LSD_{0.05}$			$^{(B)}$2.208			$^{(A)}$2.208**

* Means followed with same letter (s) are not significantly different.
**(A)=$LSD_{0.05}$ between treatments (Pesticides), and (B)=$LSD_{0.05}$ between intervals(time)

As to the performed field experiments during the summer season of 2006, the demonstrated results in Table 3 also confirm the previously detected lower effect of the tested chemicals and plant oils in season 2005.

The above-demonstrated results are in agreement with those mentioned in the work of Reed and Reed (1984) who conducted experiments to assess the efficiency of crude formulations of neem seed against economically important insect-pests of muskmelon in the greenhouse and the noctuid *Heliothis zea* on sweet maize. Their results showed that neem in 2 and 4% spray formulations gave significantly better control than no treatment. On potatoes, larvae of *Leptinotarsa decemlineata* were controlled by neem spray, but adults were not controlled; that may be resulted due to the possible adult migration. Also, on cabbage, neem gave significantly greater control of the noctuid *Trichoplusia ni.*

Moreover, Oatman and Kennedy (1986) stated that the leaf miner outbreak may be resulted from the highly toxic effect of insecticides applications upon the large parasites complex holding these leaf miners below the economic threshold. That fact gives a reasonable explation of the low efficiency of tested pymetrozine (Chess®) and thiamethoxam (Actara®) against the leaf miner, *L. trifolii.* Also, an important part of the biology of *L. trifolii* population is their ability to develop resistance to insecticides, which has made their control difficult for many years.

Ordinarily, because of the relatively recent introduction of phytophagous agromyzid, leaf miner, *Liriomyza trifolii* into Africa, Europe and Western

north of America, the insect caused serious economic losses on a wide variety of commercially produced vegetables and ornamentals. Hence, in response to the loss effectiveness of many agriculture chemicals, and the potential for rapid development of resistance to new compounds, interest in the implementation of IPM programs which utilize biological agents has increased. Meisner *et al.* (1986) evaluated the spraying and painting of neem extracts (*Azadirachta indica*) of seed Kernels on *Phaseolus vulgaris* seedlings against pre-imaginal stages of *L. trifolii*, the ethanol and methanol extracts showed the highest activity on pre-infestation application after the appearance of the first mines. In this concern, Beitie *et al.* (1991) reported that the chemical control of leaf miner, *Liriomyza trifolii* is not satisfactory because of the biology of the insect and the leaf miner's ability to develop resistance to pesticides.

On the other hand, the above-cited findings and the presented and obtained results are in contradiction with those of Tokumaru. (2005) who showed that among eight insecticides tested on second instar larvae of vegetables leaf miner, *Liriomyza sativae*, the serpentine leaf miner, *L. trifolii* and the tomato leaf miner, *L. bryoniae* on kidney bean, *Phaseolus vulgaris*, cartap (a carbamate insecticide) and thiamethoxam (Actara®) were comparatively highly toxic on the three *Liriomyza* species.

Finally, it could be concluded that azadirachtin is one of the most suitable compounds for integration into a pest management program for leaf miner species on cantaloupe plants. Also, these natural products could be applied as needed in either protected greenhouse or field cultivations without inducing undesirable fluctuations in this extent.

Effect of tested chemicals and essential oils against the inspected red spider mites on growing cantaloupe plants under low tunnels in 2005 and 2006 seasons:

The occurred infestations by the red spider mite was observed after 65 days from sowing date till the end of the growing season of cantaloupe plants. The demonstrated results in Tables 4 and 5 exhibit the calculated percentages of counted numbers of spider mites after the performance of tested chemicals and plants oils on cantaloupe plants during the summer seasons of 2005 and 2006.

From Table 4, it could be explained that both the evaluated essential oils gave a more or a less variable reduced percentages of mites numbers on the inspected plants post-treatment; indicating a comparative less toxic effect on the individuals of the red spider mite. The relative lower efficiency of each was detected from the 2nd day post-application till the 7th day for azadirachtin (Achook®); while this period of relative efficient reduction extended from the 2nd till the 17th day for Soyabean oil (Natural oil®). In this concern, Soyabean

oil (Natural oil®) was somewhat efficient against this animal-pest (80.65% at the 17th day) when compared to the azadirachtin (Achook®) which characterized by lower efficiency against the red spider mite (59.37% at the 7th day). On the other hand both the other tested chemical compounds: thiamethoxam (Actara®) and Pymetrozine (Chess®) were ratherly less efficient and indicated detectable increase in mites infestation at the beginning of 2nd day from treatment till the end of experimental period (17th day) whereas, the calculated percentages of mites reduction amounted to -6.18%, -27.96% and -9.36% -4.05%) for thiamethoxam (Actara®) and Pymetrozine (Chess®), in respect. Similar to the obtained results of the performed field experiments during the summer season of 2006, the presented results in Table 5 also show the lower effect of tested chemicals and plants oils against mites in season 2005. In a comparative less extent both of the tested soyabean oil (Natural oil®) and azadirachtin (Achook®) reduced the numbers of red spider mite on the treated cantaloupe plants. A same trend of recorded percentage values of reduction in numbers of occurring mites, the lasted period of efficient reduction for each and the general mean of reduction were merely identical to those deduced values in season 2005. Soyabean oil (Natural oil®) was relatively the efficient tested compound against the red spider mite population, followed by azadirachtin (Achook®). The chemical compound pymetrozine (Chess®) was the least efficient, but thiamethoxam (Actara®) was entirely untoxic and inefficient against this animal-pest.

Table (4). The calculated percentages of reduction of the red spider mite after 2nd application of tested chemicals on cantaloupe plants (season 2005).

Treatment	% of reduction						
	Inspection period (days)						
	No. of individuals pre-spray	2	5	7	10	17	General Mean
Thiamethoxam (Actara®)	135	-6.18	-12.00	-19.05	-39.18	-27.96	-20.87^{d*}
Pymetrozine (Chess®)	142	-9.36	-15.30	-5.06	-10.26	-4.05	-8.80^{c}
Azadirachtin (Achook®)	140	35.67	45.67	59.37	53.98	31.21	45.18^{b}
Soyabean oil(Natural oil®)	133	40.58	56.27	67.15	78.47	80.65	64.62^{a}
Control	136	--	--	--	--	--	--
General mean	--	15.18^{c}	18.66^{b}	25.60^{a}	20.75^{b}	19.96^{b}	--
$LSD_{0.05}$			$^{(B)}$2.064				$^{(A)}$1.846**

* Means followed with same letter (s) are not significantly different.
** (A) = $LSD_{0.05}$ between treatments (Pesticides), and (B) = $LSD_{0.05}$ between intervals (time)

Table (5). The estimated percentages of reduction of the red spider mite after 2nd spraying of evaluated chemicals on cantaloupe plants (season 2006).

Treatment	% of reduction						
	Inspection period (days)						
	No. of individuals pre-spray	2	5	7	10	17	General Mean
Thiamethoxam Actara®)	72	-0.46	11.28	-0.88	-26.26	-33.15	-9.89^{d*}
Pymetrozine (Chess®)	75	-13.55	24.16	24.89	-8.45	-4.08	6.34^{c}
Azadirachtin (Achook®)	81	43.80	54.62	70.71	45.85	47.58	52.52^{b}
Soyabean oil(Natural oil®)	76	33.99	63.15	74.64	63.27	81.07	63.22^{a}
Control	63	--	--	--	--	--	--
General mean	--						--
$LSD_{0.05}$			$^{(B)}$3.126				$^{(A)}$2.796**

* Means followed with same letter (s) are not significantly different.

** (A) = $LSD_{0.05}$ between treatments (Pesticides), and (B) = $LSD_{0.05}$ between intervals (time)

The above obtained results are in agreement with these mentioned in the works of many investigators; i.e. Mansour and Ascher (1983) who showed that when mites, *Tetranychus cinnabarinus* were confined on leaf-discs cut from beans (*Phaseoulus vulgaris*) that had just been sprayed with different concentrations of the extracts of kernels of neem (*Azadirachta indica*), females were repelled by the treated leaves and oviposition was reduced. The addition of solvents provided the extracts of kernels of neem with high activity against *T. cinnabarinus*. Papaioannou *et al.* (2000) reported that neem seed kernels extract (Neemark®) at concentrations of 0.5,1 and 2 % was highly toxic to *T. urticae* on the treated *Phaseolus vulgaris* leaves. Amer *et al.* (2001) tested the direct toxicity of the plant oil (Natural oil®) to eggs and females of the two spotted spider mite, *T. urticae* collected from infested cucumber leaves. It was noticed that Natural oil® has a close toxic effect for both stages of *T. urticae*. Laboratory studies also indicated that this vegetable oil was effective on all studied biological aspects of *T. urticae*. Madanlar *et al.* (2002) studied the pesticidal effects of some natural pesticides against some pests, amongst the *Tetranychus cinnabarinus*. It was shown that the pesticides, which were proved to be promising, included the organic neem (*Azadirachta indica*) oil and Neemazal T/S®.(*Azadirachta indica*) oil. The results indicated that natural pesticides can be combined with applications against the red spider mites, and releasing of natural enemies in ecological farming. The pesticide with short post harvest period (PHI) can

also be applied when the pest populations are at a critical level to support the natural pesticides in integrated pest management programs.

Surendra and Singh (2003) showed that neem seed kernel extract at 5% up to three days intervals was the most effective against the mite, *Tetrancychus macfarlanei* on pumpkin, (*C. moschata*).

Also, Duso *et al.* (2008) evaluated the botanical and reduced-risk insecticides recommended for the control of aphids, whiteflies and thrips and found that all the products affected mite survival and/or fecundity.

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تقييم أربعة أنواع من المركبات الحديثة على صانعات أنفاق الأوراق والحلم العنكبوتي التي تصيب الكنتالوب (النوبارية . البحيرة)

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الملخص العربي

في هذه الدراسة تم تقييم كل من مركب الثياميزوكسام و البايمتروزين ومركبين من اصل نباتي وهما الازادرختين او النيم وكذلك زيت فول الصويا على حشرات صانعات الانفاق والحلم العنكبوتي التي تصيب الكنتالوب في ظل ظروف الزراعات الحقلية والمحمية (تحت الانفاق) في مزرعة محطة البحوث الزراعية بالنوبارية - محافظة البحيرة خلال الموسم الصيفي لعامي ٢٠٠٥-٢٠٠٦.

واتضح من الدراسة ان معظم المركبات المختبرة كان لها تأثير منخفض الى حد ما ضد حشرة صانعات الانفاق ومع هذا فقد سجل الازادرختين نسبة خفض في الاصابة وصلت الى ٧٣.٦٧ % وذلك في اليوم السابع منذ بداية المعاملة بالمقارنة بالمركبات الاخرى وكان هذا المركب الاكثر فاعلية ضد حشرة صانعات الانفاق حيث وصلت نسبة الخفض كمتوسط عام لهذا المركب كأثر باقي الى ٥٦.٥٤% وكانت اقل المركبات المستخدمة تاثيرا على حشرة صانعات الانفاق هي الثياميزوكسام وزيت فول الصويا حيث اعطيا هذان المركبان نسبة خفض في الاصابة كمتوسط عام متساوية تقريبا وصلت الى ٣٨.٣٩%، ٣٧.٨٨% على التوالي .

وقد تبين من النتائج المتحصل عليها موسم ٢٠٠٦ ان المركبات المختبرة المستخدمة في هذا الموسم كان تاثيرها منخفضا مثل ذلك التاثير في موسم ٢٠٠٥ ضد صانعات الانفاق لاوراق نبات الكنتالوب التي تمت معاملتها. وقدا ظهرت النتائج أن أكثر المركبات فاعلية هو مركب الازادرختين واتبعه زيت فول الصويا ثم البايمترزين واخيرا كان اقلهم تاثيرا مركب الثياميزوكسام.

حيث اظهر زيت فول الصويا بعد يومين من بداية المعاملة اعلى كفاءة في تاثيرة على الحلم العنكبوتي بالمقارنة مع المركبات المستخدمة حيث اعطى اعلى نسبة خفض وصلت الى ٤٠.٥٨٥ ثم مركب الازادرخنين ٣٥.٦٧% اما بالنسبة لمركب الثياميزوكسام والبايمتروزين كان عديما الكفاءة والتاثير واظهرا تاثيرا سلبيا مع زيادة نسبة الاصابة بالاكاروسات منذ بداية اليوم الثاني من المعاملة وحتى نهاية مدة التجربة (اليوم السابع عشر) بينما سجل زيت فول الصويا اعلى متوسط نسبة خفض في الاصابة ثم اتبعه مركب الازادرختين وكانت هذه النسبة ٦٤.٦٢% ثم ٤٥.١٨% لكل منهما على الترتيب وكذلك احتفظ زيت فول الصويا بتاثيرة الفعال في تقليل الاصابة بالعنكبوت الاحمر (الحلم العنكبوتي) وذلك خلال الفترة التي اجري فيها الفحص والتقييم منذ بداية اليوم الثاني وحتي اليوم السابع عشر بعد المعاملة تلاه في ذلك مركب الازادرختين الذى احتل المرتبة الثانية في الفاعلية ضمن المركبات المختبرة أما المركب الكيماوي البايمتروزين كان اقل المركبات فاعلية وتاثيرا ضد الحلم العنكبوتي وقد ظهرت عدم فاعلية الثياميزوكسام حيث كان غير مؤثر بل وقد اظهر تاثيرة السلبي في زيادة تعداد الحلم العنكبوتي مقارنة .