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IMPACT FACTORS OF TWO NON-CONVENTIONAL COMPOUNDS ON *Spodoptera littoralis* (BOISD.)

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ABSTRACT

Cotton Leaf worm, *Spodoptera littoralis* (Boisd.) treated as 4th instar larvae by two compounds of acetyl salicylic acid (A.S.A) and chlorpheniramine maleate (C.P.M) to evaluate its efficacy on *S. littoralis* larvae as alternative new compounds for insecticides. Also, some biological and life table parameters of *S. littoralis* treated as 4th instar larvae were estimated. In addition, *S. littoralis* moths treated by LC_{50} of A.S.A and C.P.M to evaluate the mating frequency & ability and batches fluff cover shape deposited by moth in different treatments (T♂xT♀, U♂xT♀, T♂xU♀ and U♂xU♀).

Obtained results could be summarized as following:

Tested compounds of A.S.A and C.P.M were efficacy on *S. littoralis* larvae, but C.P.M was more toxicity and effective on the most estimated parameters than another compound (A.S.A).

Compounds of A.S.A and C.P.M had increased in larval & pupal mortalities, control of hatchability and sterility; also, tested compounds decreased the pupation, moth's emergency, number of eggs per female, egg hatchability and fecundity of *S. littoralis* treated as 4th instar larvae. In addition, its caused decreasing in mating frequency and ability of different crosses moth and the batches deposited without fluff covers and the egg- masses had unstable partly on the deposited surface until hatching, especially in T♂xT♀ treatments.

Moreover, the two tested compounds, especially C.P.M had drastically decreased the life table parameters as number of females/female (Mx), survival rate (Lx), net reproductive rate (Ro), intrinsic rate of natural increase (r_m), and finite rate of increase (e^{rm}). Aforementioned compounds had increased from generation (T) and doubling (DT) times.

So, A.S.A and C.P.M are considered affecting compounds against two harmful stages (larvae and moths) of *S. littoralis*, especially C.P.M, that it could be used to reduce the insecticide applications but need more experiments in a wide range.

INTRODUCTION

Spodoptera littoralis (Boisduval) (Lepidoptera: Noctuidae) is one of the most destructive pests of several crops such as cotton, *Gossypium hirsutum* L., peanut, *Arachis hypogaea* L., soybean, *Glycine max* L. and vegetables in Africa, Asia and Europe (El-Aswad *et al*., 2003). In addition to its direct damage in reducing photosynthetic area, due to its larval presence; also, feeding marks and excrement residues reduce marketability of vegetables and ornamentals (Pluschkell *et al*., 1998). Over the past 25 years, the intensive use of broad-spectrum insecticides against *S. littoralis* has led the development of resistance to many registered pesticides for its control (Aydin and Gurkan, 2006).

The current application of chemical insecticides on other crops is considered as one of the main factors affecting the agro ecosystem (plant, soil, water and other organisms). From this point of view, it is necessary to minimize the application of pesticides that considered as a main source of environmental pollution and use other compounds may proof as good alternative of insecticides. Among these compounds are acetylsalicylic acid and chlorpheniramine maleate in controlling this economic insect.

Kandil, *et al*. (2014) showed that LC_{50} of acetylsalicylic acid caused desiccation and adhesive for snail body species of *Eobania vermiculata* and *Monada obstructa*. It was caused focal necrosis especially underneath necroses destructed covering epithelium in association with degradation. Also, the same authors observed that acetylsalicylic acid was effective against both alkaline and acid phosphatase in the haemolymph of the previous two snail species.

So, the main purpose of current study to investigate the different effects of acetyl-salicylic acid (A.S.A) and chlorpheniramine maleate (C.P.M) compounds on *S. littoralis* larvae and moths. Also, the biological and life table parameters of *S. littoralis* were studied as affected by aforementioned compounds.

MATERIALS AND METHODS

A- Chemicals.

1- Acetyl-salicylic acid (Aspirin 81 tablets); Product of European Egyptian Pharmaceutical Industry, mechanism: In human body, it hydrolyzed to salicylic (active) by esterases in G1 mucosa, red blood cells, synovial fluid, and blood; metabolism of salicylate occurs primarily by hepatic conjugation; metabolic pathways are saturable. 4-6 hours; 50-75% reaches systemic circulation; half life elimination: 5-6 hours after 1g, 10 hours with higher doses.

2- Chlorpheniramine maleate (Anallerge 4, B.P. 4 mg); Product of Kahira Pharm& Chem. Ind. Co., Cairo, Egypt. Antagonize the action of histamine on the different tissues and organs in the human body except on the gastric secretions. It alleviates or completely

abolishes the signs and symptoms of allergic diseases. Producing no depressive effect on the central nervous system in the usual therapeutic doses and if the dose is increased it might produce a very sedative action.

B- Insect.

Larvae of the cotton leaf worm, *Spodoptera littoralis* (Boisd.), were reared on clean and fresh castor leaves, *Ricinus communis* L., in the Laboratory at a temperature of 25 ± 2°C and 65 ± 5% R.H. with a photoperiod of 6:18 (L:D). Insect rearing technique according to El-Defrawi (1964).

C- Bioassay

Five concentrations were prepared from the two compounds; acetylsalicylic acid (64.8, 32.4, 16.2, 8.1 and 4.05 g/L) and chlorpheniramine maleate (8.8, 4.4, 2.2, 1.1 and 0.55 g/L). Each concentration had four replicates. Each replicate included 25 healthy starved 4th instar larvae. Other four replicates were dipped in water as a control. Castor leaves were dipped into the tested concentrations for 10 s and left on dry surface, and then placed into glass cages containing mulch to avoid desiccation of leaves. Twenty five larvae were transferred into the leaves in each replicate. These cages were incubated at 25 ± 2°C and 65 ± 5% R.H. with a photoperiod of 8:16 (L:D). Larval mortality was recorded after 3-5 days.

The aforementioned concentrations of A.S.A and C.P.M were tested against *S. littoralis* moths. Ten adult moths were used for one replicate. Four replicate were done/concentrate by using piece of cotton dipped in each concentrate and hang into clean glass cages. Left the moths fed on the treated cotton about 24 hours, then hang another piece of cotton containing sugar solution 10% instead of treated cotton. Moth mortality recorded after 2-8 days from treatment.

LC_{50}; LC_{90} and slope values were assessed according to Finney (1971) by using Ldp line software (www.Ehabbakr software/Ldp line).

D- Biological parameters.

The biological parameters of *S. littoralis* treated as 4th instar larvae were investigated as follows:

1. Larval and pupal duration and mortalities.

The durations of larvae or pupae surviving treatments per replicate were recorded and averaged. Larval and pupal mortalities were corrected according to Abbott's formula (1925).

2. Pupation percentage.

Calculated as follows:

% Pupation = No. produced pupae/Total tested larvae X100

3. Moth's emergency percentage.

Moth's emergency percentages calculated as follows:

% Moths emergency = No. emerged moth/total tested larvae X100

4. Adult longevity.

Adult longevity was based upon cumulative number of males and females remaining alive each day. Pre-oviposition, oviposition and post-oviposition periods were determined by placing 5 pairs of emerged moths in a clean glass cages (17 cm height and 7-12 cm in diameter) till adult females death.

5. Egg laying and hatchability.

Egg laying (total number of eggs per female) calculated from daily counts of deposited eggs on piece of paper. Each treatment yielded data about the daily egg production and on the differential survival of females. Egg hatchability percentage was counted as follows:

No. hatched eggs/ No. deposited eggs X 100

Control of hatchability percentage calculated according to Zidan and Abdel- Megeed (1987) as follows:

No. hatched eggs in check – No. hatched eggs in treatment/ No. hatched eggs in check X 100

6. Fecundity percentage.

Calculated according to Crystal and Lachance (1963) as follows:

No. eggs per treated female/ No. eggs per untreated female X 100

7. Sterility observed and corrected percentages.

Calculated according to Zidan and Abdel-Megeed (1987) as follows:

% Sterility observed = 100 – Egg hatchability percentage

% Corrected sterility = % Sterility observed – Check/100 - Check X 100

8. Life cycle. Extended from egg deposition till adult emergence (days).

9. Life span. Extended from egg deposition till adult death (days).

The adult moths (1-day old age) of *S. littoralis* were treated in different crosses: T♂xT♀, T♂XU♀, U♂XT♀ and U♂XU♀ in 3 replicates; each replicate contained five males and five females treated by the LC_{50} of the tested compounds; A.S.A and C.P.M as previously described in adult moths method.

10. Mating frequency. Done by dissection the females under binocular to determine the presence of spermatophores after the death of female moths. Evaluation of the mating frequency was determined by counting the number of spermatophores per mated female.

11. Mating ability percentage.

Mating ability% = No. of mated females/ Total no. of experimental females X 100

12. Batches fluff cover. Were observed by using camera photo.

E- Prediction parameters.

The data of life table were analyzed by using life 48 basic computer program of Abou-Setta, *et al*. (1986).

The input data for the program includes insect name, temperature used, number of observations, the time intervals between observations, the developmental time from egg to adult female as the number of observation intervals, initial number of female, fraction of eggs laid reaching maturity, sex ratio as females per total, number of eggs laid for each interval.

The program has output data includes information for each interval of adult female age: total progeny per interval (egg laying rate) (M), number of females alive at age x (L), mean female age at each

interval mid-point (X), female progeny per female produced during the day x (Mx), rate of survival (Lx), the product of [(Mx)(Lx)] as (MxLx), and the final values of RML (the product of (Mx)(Lx) divided by the value of e (the base of natural logarithm to the power of (r_m))

Finally, the program prints the precise life table sheet parameters as the sum of RML, the generation time (T) was calculated by [Σ ((X)(Lx)(Mx))/Ro], the net reproductive rate (Ro) was calculated by [Σ((Lx)(Mx))], the doubling time (DT) resulted from dividing the normal logarithm on r_m, the intrinsic rate of natural increase (r_m) was calculated by [ln (Ro)/T] and the finite rate of increase (e^{rm}) that was natural antilogarithm of the intrinsic rate of increase, doubling time (DT) that was number of times that the population multiplies in a unit time and the sex ratio was calculated.

F- Statistical analysis.

All biological and life table parameters of *S. littoralis* were analyzed using Costat statistical program software, 1990 and Duncan's multiple range test (Duncan, 1955) at 5% probability level to compare the differences among time means.

RESULTS AND DISCUSSION

1. Efficacy of A.S.A and C.P.M on *S. littoralis* larvae and moths.

Cotton Leaf worm, *S. littoralis* treated as fourth instar larvae was more susceptible to chlorpheniramine maleate C.P.M than acetyl salicylic acid A.S.A after 3-day from treatment passed as showed in Table (1). Also, the same trend was happened after 5-day from treatment passed. Table (2) demonstrated that C.P.M efficacy was higher on *S. littoralis* moths than A.S.A after 2-day from treatment. Also, the LC_{50} values decreased with time passed until reach to 5.99 and 8.88 g/L for C.P.M and A.S.A, respectively after 8-day from treatment of moths were passed.

Table (1): Efficacy of tested compounds against *S. littoralis* treated as 4th instar larvae

Compounds	LC_{50} (g/L) 95% Confidence limits	LC_{90} (g/L) 95% Confidence limits	Slope ±SE
After 3-day from treatment			
A.S.A	20.1 18.88 ±30.28	50.86 30.21 ±70.56	3.1± 1.171
C.P.M	18.3 12.89±29.92	46.56 28.98±67.70	3.2± 1.142
After 5-day from treatment			
A.S.A	14.92 9.89±35.78	37.85 16.89±52.79	2.82± 1.152
C.P.M	11.98 6.895±21.32	36.86 18.56±48.65	2.82± 1.143

A.S.A: Acetyl salicylic acid C.P.M: Chlorpheniramine maleate

Table (2): Efficacy of tested compounds against *S. littoralis* moths

Compounds	LC_{50} (g/L) 95%Confidence limits	LC_{90} (g/L) 95%Confidence limits	Slope
After 2-day from treatment			
A.S.A	29.8 25.5±35.3	60.6 52.2±69.3	3.1± 1.821
C.P.M	26.3 24.4±32.5	58.5 50.5±62.5	3.2± 1.452
After 4-day from treatment			
A.S.A	26.9 20.8±39.2	42.6 30.6±49.8	2.84± 1.215
C.P.M	22.6 18.6±34.8	38.5 31.3±48.5	3.1± 1.121
After 6-day from treatment			
A.S.A	15.4 9.28±28.8	29.2 21.3±37.8	3.12± 1.121
C.P.M	11.44 7.42±22.2	24.62 18.11±32.3	3.3± 1.12
After 8-day from treatment			
A.S.A	8.88 4.33±15.15	15.1 11.11±22.4	3.9± 0.31
C.P.M	5.99 3.12±11.2	12.5 8.21±19.21	4.1± 1.20

A.S.A: Acetyl salicylic acid C.P.M: Chlorpheniramine maleate

2. Biological aspects of *S. littoralis*.

Cotton leaf worm, *S. littoralis* treated as 4th instar larvae with two compounds of acetyl salicylic acid (A.S.A) and chlorpheniramine maleate (C.P.M). The compounds had not change in larval and pupal durations and the data was the same result of the control as in Table (3). While, the same compounds caused larval mortality percents increased to reach 66.3 and 70% for A.S.A and C.P.M, respectively compared to control (1%). Also, C.P.M had pupal mortality (8.1%); meanwhile, A.S.A caused slightly pupal mortality% increased (3.15%) than control value (2%). In addition, Table (3) showed that pupation% decreased to 37.5 and 33.8% for A.S.A and C.P.M compared to pupation% of control (99%).

Table (4) cleared that C.P.M compound caused decreasing in *S.littoralis* moth emergency to 29.4% and no. of egg reach to 550 egg/ female compared to another compound (A.S.A) that had 30.6% moth emergency and 600 eggs /female. Adult longevity had the same value in both male and female in C.P.M treatment; while, the same longevity was longer in the females (16 days) compared to the males (9 days) in A.S.A treatments. Also, the same table cleared that periods of oviposition (7 days) and post oviposition (8 days) that had the same value nearly in A.S.A treatment; while, in C.P.M treatment, the oviposition period was longer (10 days) than post oviposition period (4 days) as the same trend of control (13 days for oviposition and 5 days for post oviposition periods).

Table (3): Effect of tested compounds on larval and pupal biological parameters of *S. littoralis* treated as 4th instar larvae.

Compounds	Larval Duration (days)	Pupal Duration (days)	% Larval mortality	% Pupal mortality	% Pupation
A.S.A	20 [a]	11 [a]	66.3 [b]	3.15 [b]	37.5 [b]
C.P.M	20 [a]	11 [a]	70 [a]	8.1 [a]	33.8 [c]
Control	20 [a]	11 [a]	1 [c]	2 [c]	99 [a]
$LSD_{0.05}$	-	-	4.2	1.2	4.7

A.S.A: Acetyl salicylic acid C.P.M: Chlorpheniramine maleate

Table (4): Effect of tested compounds on moth biological parameters of *S.littoralis* treated as 4th instar larvae.

Compounds	% Moth emergency	No. of egg/female (No.batches)	Adult longevity (days)		Adult longevity (days)		
			♂	♀	Pre-oviposition period	oviposition period	Post-oviposition period
A.S.A	30.6 [b]	600 (4) [b]	9 [c]	16 [b]	2 [a]	7 [c]	8 [a]
C.P.M	29.4 [c]	550 (4) [c]	16 [a]	16 [b]	2 [a]	10 [b]	4 [c]
Control	97 [a]	850 (5) [a]	14 [b]	20 [a]	2 [a]	13 [a]	5 [b]
$LSD_{0.05}$	1.28	18.56	2.21	4.1	-	2.98	1.12

A.S.A: Acetyl salicylic acid C.P.M: Chlorpheniramine maleate

Table (5) showed that egg hatchability percent of *S.littoralis* control was 100%. This percent decreased to 75 and 64.3% in A.S.A and C.P.M treatments, respectively. The two compounds had 16.7 and 28.6% decreased in control of hatchability for A.S.A and C.P.M, respectively. Fecundity% was 70.6 and 64.7% for A.S.A. and C.P.M, respectively compared to fecundity of control (100%). Compound of C.P.M had 28.6% corrected sterility, followed by A.S.A (16.7%). Life cycle and span had the same value in two treatments, but it decreased about one day compared to control as in Table (5).

Table (5): Effect of tested compounds on fecundity, sterility and life of *S.littoralis* treated as 4th instar larvae.

Compounds	Egg Hatchability %	Control of hatchability %	Fecundity %	Sterility observed %	Corrected sterility %	Life cycle (days)	Life Span (days)
A.S.A	75 [b]	16.7 [b]	70.6 [b]	25 [b]	16.7 [b]	34 [b]	50 [b]
C.P.M	64.3 [c]	28.6 [a]	64.7 [c]	35.7 [a]	28.6 [a]	34 [b]	50 [b]
Control	100 [a]	-	100 [a]	-	-	35 [a]	51 [a]
$LSD_{0.05}$	10.2	-	10.42	-	-	1.1	1.2

A.S.A: Acetyl salicylic acid C.P.M: Chlorpheniramine maleate

Mating frequency in normal female was reached ten times in some females (Table 6), while, the number of spermatophores/ mated female averaged four and three spermatophores for A.S.A and C.P.M treatments at the end of female life, respectively. Significant reductions on the mating frequency in treated moths were obtained previously by many investigators when they tested different compounds against some cotton

insects (Eid and Moursy 1992; Salem *et al.,* 1994 and Mohamed *et al.,* 1996). They mentioned that the number of spermatophores per mated female significantly reduced when both or either sex was treated compared with the control. Also, they added that the number of malformed spermatophores increased when crosses were contained treated males and females.

Moths treatment by C.P.M had 3 spermatophores in T♂x T♀ as well as number of spermatophores in case of treated male moths only (T♂x U♀) and the number reach to 6 spermatophores in treated female only U♂x T♀ as showed in Table (6). The same trend was found in A.S.A treatments. While, the number of spermatophores of normal female (U♂x U♀) was 10.

Mating ability (no. of mated females/total number of female) was mentioned decreased in both compound treatments especially in C.P.M treatments (28%), followed by A.S.A (33.3%). Also, T♂x T♀ was the most harmed in mating ability, followed by crosses of T♂x U♀ and U♂x T♀ in both compound treatments compared to normal mating ability percentage (80%) as demonstrated in Table (6).

Another showing in U♂xT♀ crosses, the batches seemed slightly fluff covered in both compound treatments. T♂xU♀ appeared fluff covered partly in both treatments compared with the control (U♂xU♀) that seemed completely covered with fluff as shown clearly in Figure (1). Also, the tested compounds effect on the adhesive material that found during oviposition. Thus, the deposited egg batches not only without fluff cover but also it fallen from deposited surface that caused harm to egg or hatched away its feed, especially if each of tested compounds sprayed in open field; also, may be easy prey for predators or parasites.

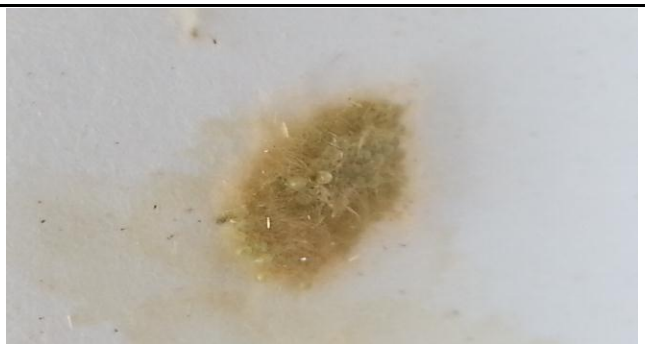
1. Life table parameters of *S. littoralis*.

Figure (2) showed that female progeny/ female (Mx) of untreated *S. littoralis* ranged between 17.5 and 416.67. The last values drastically decreased in females treated as 4th instar larvae especially in C.P.M treatment (Mx: 8.68 – 259.5 female progeny/female); while, A.S.A (Mx: 7.7 – 360 female progeny/ female) initiated from *S. littoralis* 4th instar larvae compared to control. The survival rate (Lx) parameter ranged between 14.79 and 100 times in normal females of *S. littoralis*. Lx value ranged from 23 to 90 times in both treatment (C.P.M and A.S.A).

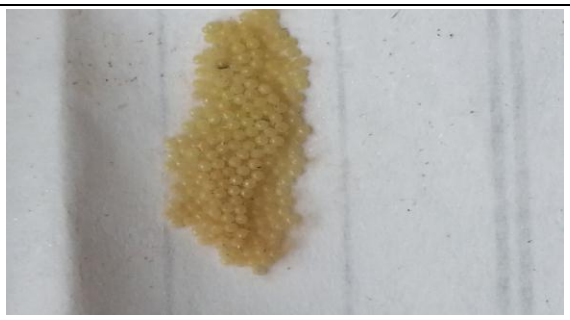
Table (6): Mating frequency (No. spermatophores/ mated female) and mating ability percentage of *S. littoralis* moths treated with LC_{50} of tested compounds.

Compounds	Crosses					
	T♂xT♀		T♂xU♀		U♂xT♀	
	% Mating ability	No. spermatophores/ Mated female (Range)	% Mating ability	No. spermatophores/ Mated female (Range)	% Mating ability	No. spermatophores/ Mated female (Range)
A.S.A	33.3 [b]	4 [b] (0-5)	33.3 [a]	3 [a] (0-5)	45 [a]	8 [a] (0-10)
C.P.M	28 [c]	3 [b] (0-4)	28 [b]	3 [b] (0-4)	35 [b]	6 [b] (0-8)
Control (U♂xU♀)	80 [a]	10 [a] (6-16)	-	-	-	-
LSD $_{0.05}$	5.12	7.32	5.01	0.012	9.989	2.21

A.S.A: Acetyl salicylic acid C.P.M: Chlorpheniramine maleate



U♂xU♀ (Control)



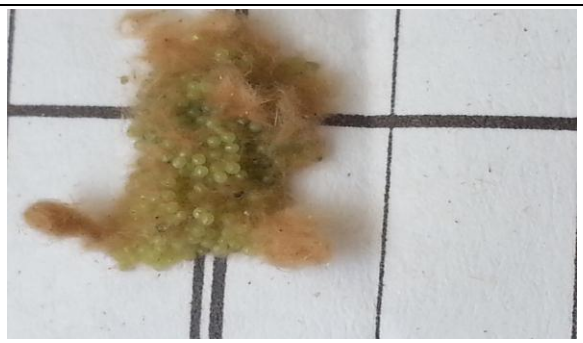
T♂xT♀ (C.P.M)

T♂xT♀(A.S.A)

U♂xT♀ (C.P.M)

U♂xT♀ (A.S.A)

T♂xU♀(C.P.M)



T♂xU♀(A.S.A)

Figure (1): Effect of tested compounds on the batches fluff cover of different *S. littoralis* crosses moths.

A.S.A: Acetyl salicylic acid C.P.M: Chlorpheniramine maleate

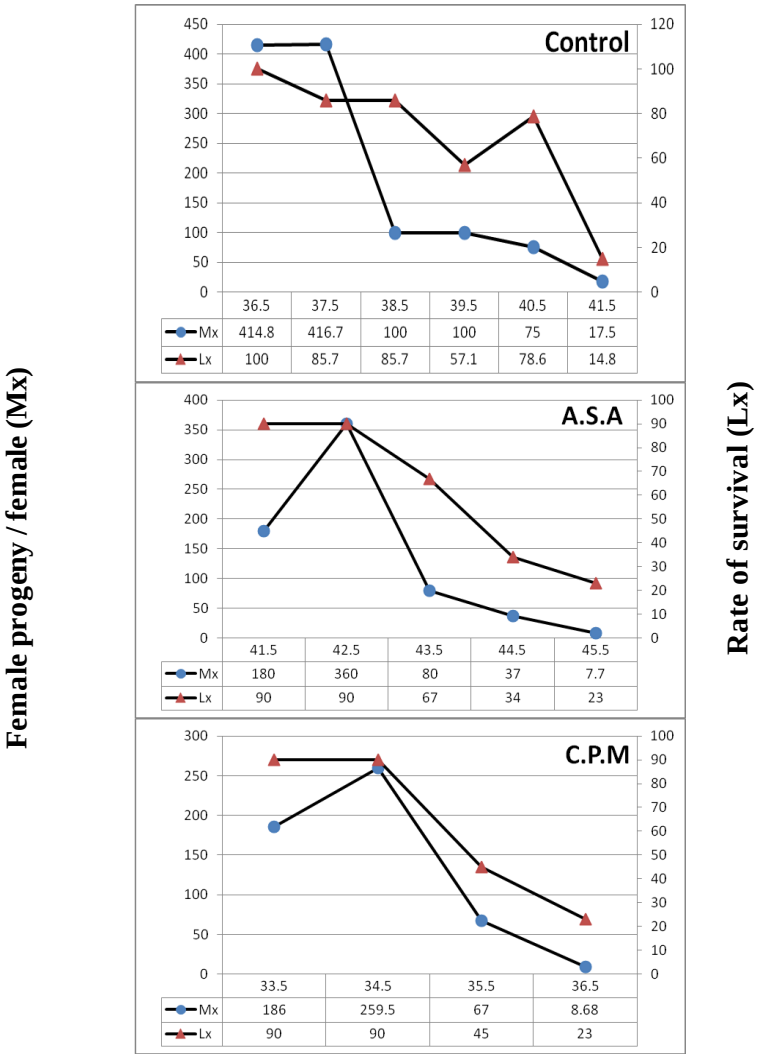


Figure (2): Effect of tested compounds on the female progeny/ female (Mx) and survival rate (Lx) of *S. littoralis* treated as 4th instar larvae.

A.S.A: Acetyl salicylic acid C.P.M: Chlorpheniramine maleate

Table (7) illustrated the life table parameters of *S. littoralis* treated as 4th instar larvae. Generation time (T) increased between 42.18 and 40.12 days for C.P.M and A.S.A, respectively compared to control (38.21 day). Also, doubling time, DT (time that multiply in one generation) was increased in both treatments and had the same value nearly. Net reproductive rate (Ro) decreased and reached between 270 and 260 females/ female in A.S.A and C.P.M, respectively compared to control (425 females/ female). The same trend was found in the intrinsic rate of natural increase (r_m) (times/female/day), finite rate of increase (e^{rm}) (times/female/day) and sex ratio, the parameters had decreased values compared to normal *S. littoralis* life table parameters.

Table (7): Life table parameters of *S. littoralis* treated as 4th instar larvae with LC_{50}'s of tested compounds.

Compounds	T (days)	(Ro)	Increase rate		DT (days)	Sex ratio
			r_m	e^{rm}		
A.S.A	40.12 [b]	270 [b]	0.141 [b]	1.21 [b]	4.65 [b]	0.48 [b]
C.P.M	42.18 [a]	260 [c]	0.139 [c]	1.19 [c]	4.87 [a]	0.47 [c]
Control	38.21 [c]	425 [a]	0.30 [a]	1.34 [a]	2.21 [c]	0.5 [a]
$LSD_{0.05}$	2.24	8.98	0.019	0.02	0.22	0.01

(T) = Generation time (Ro) = Net reproductive rate (DT) = Doubling time
(r_m) = Intrinsic rate of natural increase (e^{rm}) = Finite rate of increase
A.S.A: Acetyl salicylic acid C.P.M: Chlorpheniramine maleate

Peng, *et al*. (2004) investigated the role of the salicylic acid (SA) signaling pathway in defense responses of tomato plants to the herbivore, cotton bollworm. After exposure to the cotton bollworm, tomato leaves rapidly accumulated a high level of SA. An enhanced endogenous SA level was accompanied by an increase in the endogenous H_2O_2 level as compared with controls. Spraying tomato plants with a solution containing either SA or methyl salicylic acid (Me-SA), the H_2O_2 level dramatically increased. These data proved that the SA pathway was involved in the tomato plant defense responses to the herbivore. In addition, Leon-Reyes, *et al*. (2010) reported that Jasmonates (JAs) and salicylic acid (SA) are plant hormones that play pivotal roles in the regulation of induced defenses against microbial pathogens of necrotrophic fungus, *Alternaria brassicicola* and insect herbivores, *Pieris rapae*. Meanwhile, Amer and Nafea (2011) found that propolis is a natural resin produced by honeybees colonies in two kind (Egyptian and Chinese propolis) were tested against some injurious pests i.e. eggs, newly hatched and 4th instars larvae of the pink bollworm, *Pectinophora. gossypiella* (Saund.), 4th instar larvae of the cotton leaf worm, *S. littoralis* and the cowpea aphid, *Aphis craccivora* (Koch) adults and nymphs. Phenolic compounds from PEE soluble in ethanol 80% were subject to HPLC separation. There were 62 and 66 separation compounds in Egyptian PEE, and Chinese PEE, respectively and 25 compounds were identified by comparison with authentic samples (RT). E.PEE rich in phenolic compounds as salicylic acid, coumaric acid, trans- cinamic acid, chrysin and dihydroxy isoflavone were more than in C.PEE. The resulted showed that, the newly hatched larvae is considered the most susceptible stage of the pink bollworm, followed by 1, 2, 3 and 4-day old eggs. The propolis toxicity effect on the 4th instar larvae of *S. littoralis* especially at 5-7 days after treatments. Adults and nymphs of the cowpea aphid, *A. crassivora* were affected and susceptible to propolis treatments.

Generally, acetyl salicylic acid (A.S.A) and chlorpheniramine maleate (C.P.M) are two new compounds made the deleterious effect on the Cotton Leaf worm; *S. littoralis* when treated as 4th instar larvae or moths stages. The efficacy and biological parameters were obvious the pest susceptibility to the tested compounds. Also, the compounds made the change in *S. littoralis* that appeared in the most biological parameters used when *S. littoralis* treated as 4th instar larvae and adult moth as fecundity, sterility, mating and batches fluff cover that gave the chance for predating and parasitism by natural enemies and environmental effect to harm the egg stage; in addition, the deposited eggs had unstable partly on the deposited surface that lead to fall before hatching. Hence, the two compounds may be decreased from current population and following generations when it applies on the pest or it may be reduce insecticide applications by increasing the experiments in a wide range.

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العوامل المؤثرة لإثنين من المركبات الغير تقليدية على دودة ورق القطن

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عوملت يرقات دودة ورق القطن (.*Spodoptera littoralis* (Boisd فى العمر اليرقى الرابع بمركبي الأسيتيل سالسيليك أسيد (A.S.A)والكلورفينرامين ماليت (C.P.M) وذلك لدراسة ما يحدثانه من تأثير سام على يرقات دودة ورق القطن كبدائل جديدة لاستخدام المبيدات. كما تم تقييم بعض القياسات البيولوجية وجداول الحياة لدودة ورق القطن المعاملة بالتركيز النصفى المميت فى العمر اليرقى الرابع بالإضافة إلى تقييم عدد مرات التزاوج (عدد الأكياس المنوية) والقدرة على التزاوج والأغطية الزغبية للطع اللتى وضعت على البيض فى المعاملات المختلفة للفراشات (ذكور معاملةٌ x إناث معاملة - ذكور معاملةٌ x إناث غيرمعاملة - ذكور غيرمعاملةٌ x إناث معاملة - ذكور غيرمعاملةٌ x إناث غيرمعاملة).

ويمكن تلخيص أهم النتائج كما يلى:

سببا المركبين A.S.A و C.P.M المختبرين تأثيرا ساما على يرقات دودة ورق القطن وخاصة مركب C.P.M اللذى أعطى أفضل النتائج بالمقارنة بالمركب الآخر A.S.A.

أدى مركبى الـ A.S.A و C.P.M إلى زيادة النسبة المئوية للموت اليرقى والعذرى والتحكم فى فقس البيض والعقم. كما أدى نفس المركبين إلى خفض فى النسبة المئوية للتعذير وخروج الفراشات – عدد البيض/ أنثى والنسبة المئوية لكلا من فقس البيض والخصوبة وذلك لدودة ورق القطن التى عوملت فى العمر اليرقى الرابع. بالإضافة إلا أن المركبين المختبرين أديا إلى خفض عدد مرات التزاوج (عدد الأكياس المنوية) والقدرة على التزاوج فى المعاملات المختلفة للفراشات كما أديا إلى وضع لطع دون الغطاء الزغبى وحالة من عدم ثبات جزئى للبيض على السطح الموضوع عليه حتى الفقس خاصة فى معاملة ذكور معاملةٌ x إناث معاملة بالمركبين السابق ذكرهم.

بالإضافة إلى ما سبق تأثرت جداول الحياة بالمعاملات المختلفة للمركبين المختبرين خاصة المعاملات بمركب الـ C.P.M حيث أدى إلى خفض شديد فى عدد الإناث/أنثى (Mx)- معدل الحياة (Lx)- معدل التناسل (Ro)- القدرة التكاثرية الموروثة (r_m)- معدل الزيادة النهائى (e^{rm}) وذلك مقارنة بالكونترول. بينما أديا المركبين السابق ذكرهم إلى زيادة فترة الجيل (T)- فترة تضاعف الجيل (DT) مقارنة بالكونترول.

مما سبق يعتبر المركبين المختبرين A.S.A وC.P.M أثرا تأثيرا بالغا على يرقات وفراشات دودة ورق القطن وخاصة مركب الـ C.P.M مما قد يساهم فى التقليل من استخدام المبيدات بعد أجراء مزيد من الإختبارات للمركبين على مدى واسع.