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Comparative Efficacy of Uphold and Closer Insecticide on the Developmental, Reproductive, Biochimical and Histological of the Spiny Bollworm, *Earias insulana* (Boisd.)

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ABSTRACT

This work had done to assess the toxic and impact of Closer 24 % SC (sulfoxaflor) and Uphold 36% SC (Spinetoram 6% + Methoxyfenozide 30%), considered as effective and selective insecticides for controlling especially of *E. insulana* under laboratory conditions where the two insecticides are a commercially produced considered being a valuable insecticides control agent of many insects. The compatibility of *these* two control strategies was tested by evaluating the lethal effects resulting from ingestion of Uphold and Closer residues on treated *E. insulana* under laboratory conditions. The results revealed that LC_{50s} were 0.349 and 1.090 ppm, when larvae treated with closer and uphold, respectively. The results exhibited a significant prolonged in duration two stages larval (25.3 and 20.6 days/larvae) and pupal formed (11.6 and 14.6 days/pupa) resulted from two tested compounds, respectively, the two tested compound caused significantly prolonged preoviposition and shortened oviposition periods and decreased pupation, adult emergence and hatchability percentages. Treatment with uphold and closer caused significally decreased in total lipid 6.93&4.31 (mg/g.b. wt) compared with un treated 8.97(mg/g.b.wt) and also reduction in chitinase and N- acytel-glucoseamine of the two tested compounds (46.97&58.19 µg NAGA x103/min/g.b.wt) and (97.60 &112.90µg NAGA /g.b.wt) compared with control (87.80&173.90), respectively. The deformation histological observations in the mid gut and fat body of *E. insulana* resulted that this instar is very sensitive to the closer tested compound. Modifications in the mid-gut and visible feature changes in volume, morphology and deformation in the midgut epithelium. The epithelial of the midgut appears flimsy and is dominated by asymmetrical and abnormal morphologically formations of goblet cells compared to the untreated larvae.

INTRODUCTION

Spotted bollworm *Earias insulana* (Boisd.); belongs to the genus *Earias*, sub-family: Chlophorinae, family: Nolidae, It is considered highly active in summer, from Jun to September on cotton (Paulraj and Lgnacimuthu, 2004). It has been recorded in several countries in Africa and is also known as a cotton pest (Kumar *et al*., 2014). All instar larvae

attack the bolls and the flower buds and feed on the growing tissue of top boring for the soft and growing tissues especially the terminal buds (Khan *et al.*, 2007). As a result, it causes economic damage that leads to losses in quantity and quality (Gaaboub, *et al.*, 2016 and Amer, *et al.*, 2015). Some chemical insecticides are applied for pest management (Dinham B., (1993). The development of insecticides has synthesized many compounds including new groups with specific modes of action for controlling the insects, (Dhadialla *et al.*, 1998). Which direct effect from eggs to inhibit the immature stage (metamorphosis) to adult emergence (Miyamoto *et al.*, 1993). Closer SC (active ingredient sulfoxaflor), is a novel sulfoximine insecticide (the first active one in a new class of insecticides) with a unique mode of action depending on the sap-feeding pest, which is ideal for controlling insects resistant to other insecticide classes. The Closer™ SC was discovered by Dow Agro Sciences called the sulfoximines, it runs quickly through the plant to deliver translaminar and systemic activity. Pests are controlled by contact and /or ingestion, resulting in fast knockdown and killing of the pest. Sulfoxaflor inhibit and play an important role in interactions with nicotinic acetylcholine receptors (nAChR) of insect. The mixture of insecticides becomes more useful for applying a way for toxicity and mortality of various pests and reducing insect population (Liguori *et al*., 2010 and Halder *et al.*, 2021). Under laboratory study, the used Uphold 36% SC (Spinetoram 6% + Methoxyfenozide 30%), when different instars *E. insulana* larvae were exposed and feeding, observed to stop feeding immediately and notice that time taken 3 to 5 days to kill the pest, (Kandil *et al.*, 2022). The adverse effects of toxic active ingredients for insecticide mixtures compound interbody and physiology pests against insects, depend on different mechanisms of insecticide and modes of action (Bolognesi and Merlo, 2011; Kandil *et al.*, 2012 and Kandil *et al*.,2020). Some studies recorded uphold causes a reduction of protein, amino acid, and lipid production in cells (Zhao *et al*., 2018 Kandil *et al*., 2021).

The majority objective of the present work aimed to investigate the impact of two compounds on some biological physical and histological parameters of *E. insulana*.

MATERIALS AND METHODS

Experimental Insect Stock:

The experimental insects, 1st instar larvae, susceptible laboratory strain of *Earias insulana*, it was obtained from cultures maintained in the laboratory of Bollworms Research Department, P.P.R.I., and A.R.C. It was reared for at least two years, with no history of exposure to any insecticides, on semi modified diet (Amer, 2015) in laboratory conditions at 26±2 ºC and 70- 75 RH.

The Commercial Compounds Experiment:

Commercial formulations of the insecticides were used as follows;

1-Uphold 36% SC (Spinetoram 6% + Methoxyfenozide 30%) obtained from Cortevaagri science company. The rate of application: 125cm3/Feddan.

2- Closer 24 % SC. a chemical class called the sulfoximines (sulfoxaflor)

Toxicity Tests Insecticides:

Preliminary experiments were performed to estimate the approximate dose concentrations of two tested compounds, which caused about 80 – 20 % dead neonate larvae of the pest**.**

Concentrations (ppm) Preparation:

After preliminary the (stock), a series numbers of concentrations for each compound were used; each from both stocks was freshly prepared (in water), depending on the active ingredient, based on ppm by diluting the commercial formulation., six concentrations were

(4.46, 2.23, 1.115, 0.557, 0.278 and 0.139 ppm) for Uphold and (1. 713, 0.856, 0.428, 0.216, 0.108 and0.054 ppm) for Closer were prepared and used**.**

Toxicological Studies:

Determine the toxicity (LC_{25}, LC_{50}, and LC_{90} (ppm values) of two tested compounds, Uphold, and Closer on 1st instar larvae of *E. insulana*; The Serial concentrations of Uphold and Closer were freshly prepared. Three replicates were used, each replicating 40 tubes, measured ($2x7.5cm^2$), and each containing nearly 2 gms. of diet / concentration was used. Larvae per tube were transferred to the diet surface, which treated with one drop equal 0.2 ml of each concentration/tube. Another group from tubes and larvae was used as untreated; it was treated with water only. After one day, the observed larval dead were counted and estimated corrected according to Abbott's, (1925). LC_{25}, LC_{50} and LC_{90} Values of the tested compounds were calculated according to, Finney, (1971).

Determination of Developmental Parameters:

For some parameter assay, the LC_{50}, (ppm values) of the two compounds were used against, the newly hatched larvae of *Earias insulana* transferred individually to the diet tubes by camel hair brush treated with The LC_{50} value of each compound. Live larvae after 24hr. from treated were transferred on newly diet without any treatment. At the same time, the untreated check was applied with distilled water only. In all examined three replicates used each replicate 50 tubes, each of them containing approximately 3 grams of diet used for each compound, in addition to the other three replicates for the untreated check. All tubes were capped by cotton wool and kept under the same conditions and inspected daily until the adult's emergence. Some parameters were estimated as follows**:**

Larval Stage: Duration in days, weight (mg), % reduction in weight and % mortality.
Reduction %= % living in check-% living in the treatment/ check X100 (Abbott, 1925).

Pupal Stage: % pupation, duration (days), weight (g), % reduction in weight and % mortality.

In addition, the moth emergence from two LC_{50s} was sexed and kept in cages. three replicates; each had 3malesX3 females in glass cages, the top and bottom of the cage were covered with screening mesh for stimulating egg-laying response for the females. Cages for each compound were recorded as follows:

Moth Stage: Pre and post -oviposition, the time required for egg lay, ♂ and ♀ moth longevity (days), sex ratio (female/total), no. of egg/female, % hatchability**.**

Statistical Analysis:

For every single chemical used and control; data of the biological aspects were done in three replicate/treatments and statistically analyzed with variance (ANOVA) [Costat satirical program, 1990] at least significant difference (L.S.D) test and the probability level $P < 0.05$ was considered statistically significant by Duncan, (1955).

Physiological Assay:

Some biochemical parameters, of two tested compounds (uphold and closer), were evaluated. 100 newly hatched larvae of SBW were transferred individually to glass tubes (3X 10 cm) containing the diet treatment with LC_{50} of uphold and/ or closer after 24 hr. alive larvae transfer to the diet untreated and kept under the previous controlled conditions. The samples of SBW larvae were collected after 10 days and kept in a refrigerator for biochemical analysis.

Biochemical Parameters:

Different methods were used for determined; the total lipids, glucose and enzyme activities amylase, glutamic oxaloacetic (GOT = ALT) and pyruvic (GPT = AST) transaminase according to Koller, (1984), Drevon and Schmitt, (1964), Henry and Chiamori, (1960); Trinder, (1969) and Murray, (1984) chitinase enzyme (Bade and Stinson, 1981).

Histological Studies:

The histological studies were conducted on newly hatched larvae of *E. insulana* using the feeding technique method at the LC_{50} concentrations of Uphold and Closer After ten days from treatments, samples were taken and kept in 10% formol saline for 12 hours followed by the rest of the histological stages of making sectors. The insect tissue sections were collected on glass slides and then deparaffinized, stained by hematoxylin and eosin stain for routine examination under the electric microscope (Banchroft *et al.,* 1996). To compare histological changes, specimens from the control of the treatment were sampled.

RESULTS

Assessment Essay:

The evaluation assay for the effect of two experiment-tested compounds against the 1st instar larval (3- 6 hr. after hatchability) of susceptibly strain *E. insulana,* revealed that both materials used had good lethal effects. Insecticides were attractive to *E. insulana* pests on their own. The two tested compounds were calculated analyzed and recorded in Table (1) and showed statistically significant attraction on the criterion of % positive response, the LC_{25}, LC_{50}, and LC_{90} values of Uphold and Closer tested compounds indicated that the Closer is considered to be the more toxic and highly potent. Because, LC_{50}, value (high& low) is estimated at 0.349 ppm, followed by Uphold LC_{50}, it is high increased nearly three times value than closer. it estimated by 1.090ppm.

Table 1: Toxicological efficacy of Uphold and Closer tested against Spiny bollworm larvae at 26.0 ± 2 °C and 70- 75% RH**.**

Treated stage	Compounds used	LC (ppm)			
		LC_{25}	LC_{50}	LC_{90}	Slope ± SE
E. insulana neonate larvae	**Uphold**	**0.531**	**1.090**	**6.291**	2.161 ±0.170
	Lower slope	0.436	0.950	4.82	
	Upper slope	0.624	1.249	8.94	
	Closer	**0.0955**	**0.316**	**5.857**	1.297 ±0.116
	Lower slope	0.0632	0.251	3.88	
	Upper slope	0.129	0.386	10.358	

Duration of *E. insulana*:

All biological data revealed statistically significant attraction on the criterion of all level items of attraction from upholding was substantially less than that from the closer. At the same conditions (26.0 ± 2 °C and 70 - 75% RH), observation the impact of LC_{50} for Uphold (1.09) and/or Closer (0.316, against SBW larval, pupal duration and mortality were observed and estimated. The results in Table (2) showed statistically significant attraction on the criterion of the two treatments; Uphold and Closer, they increased the larval time duration to 25.3 and 20.6 days/larvae for previously mentioned compounds, respectively, compared with 15.2 days in untreated. Besides, also, the two treatments high a significant effect on pupal duration time, elongation of the pupal formed at to11.6 and 14.6 days/pupa with Uphold and Closer, respectively, compared to 7.6 for untreated. Subsequently, the times required for *E. insulana* pest to complete the duration of total immature stages (larvae and pupal stages) was highly elongated to reach 36.9 and 35.2 days with Uphold and Closer, respectively, compared with 22.9 days in untreated, in additional, the percent of pupation formed were 88.0 and 80.3, respectively, compared with 100.0% for the check. The data

clear that both compounds increased the time duration from 10.3 to 14.1 days to the time required for the normal *E. insulana* to complete the immature stage Table (2).

Table 2: Impact of Uphold and Closer LC_{50} on times required to complete immature stages of *E. insulana.*

insecticides		Conc. (%)	Larvae time in days		Pupae time in days		% Pupation	Total immature stages in days	
			Duration (days ±SE)	Increased in times duration	Duration (days ±SE)	Increased in time duration in days		Duration in day s± S.E.	Increased in times duration in days
E. insulana	Uphold	1.090	25.3 ± 1.6	+ 10.0	11.6± 0.6	+ 4	88.0±2.1	36.9± 2.6	+ 14.1
	Closer	0.316	20.6 ±1.3	+ 4.3	13.6±1.3	+ 6.0	83.3±1.1	34.2±2.3	+ 10.3
	Control		15.2±0.9	--	7.6±0.5	--	100.0	22.8±0.5	----
	LSD		2.531	==	0.436	--	2.621	2.065	---
	P		**		***		**		

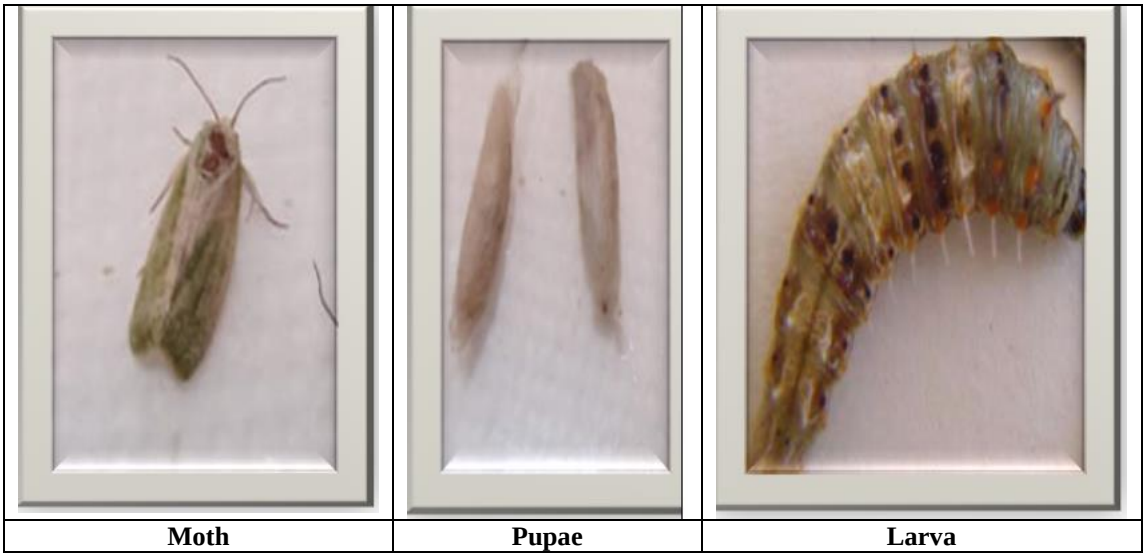
The data presented in Table (3) recorded that the Closer had a high effect on the weight of *E. insulana* full-grown larvae than Uphold compound. It is shown in Table (3) clearly that the use of LC_{50} of Uphold and Closer insecticides, cussed a significant decrease in larval and pupal weight, approximately half time, flowed by small in size. It recorded by 0.0289± 0.001 and 0.0213±0.002 mg/ larvae 0.0201± 0.003 and0.01266 ± 0.002 mg/ pupae compared to 0.0456±0.001mg/ larvae and 0.0413±0.001mg/ pupae in untreated. At the same time, a significant increase in malformation for both stages compared with untreated (chick). These malformations were recorded by 7.0 and 5.0 percent for larvae resulting from the two compounds, respectively compared with 3% in untreated. On the other hand, results recorded, 5.0 and 3.0 percent of malformed pupae with Uphold and Closer treatment, respectively, (had the largest morphological distortion), compared with larvae in untreated Table (4) and Figures (1,2&3).

Table 3: Adverse effect of LC_{50} on Reduction % in weight full grown and pupae of *E. insulana* under controlling conditions.

Insecticides used		Conc. (ppm)	Larvae		Pupae	
			Weight	Reduction %	Weight	Reduction %
E. insulana	Uphold	1.090	0.0289± 0.001	- 0.0173	0.0201± 0.003	- 0.0212
	Closer	0.316	0.0213±0.002	- 0.0143	0.0166 ± 0.002	- 0.0235
	Control		0.0456±0.001	--	0.0413±0.001	----
	LSD		0.0054	--	0.0014	
P			**		**	

Table 4: Adverse effect of LC_{50} of each tested insecticide on malformed *E. insulana* under laboratory conditions.

Insecticides used		Conc. (ppm)	% Of larvae		% Of Pupae	%Adult	
			Dead	Malformed	Malformed	Emergence	Malformed
E. insulana	Uphold	1.090	64.9± 3.6	7.3± 0.2	5.0± 0.0	94.0	6.0
	Closer	0.316	71.3 ± 3.6	5.0±0.1	3.0±0.1	90.0	9.0
	Control		8.3±0.5	1.5±0.1	0.0	100	2.0
	LSD		6.820	1.330	0.361	7.21	0.311
	P		**	**	**	*	***



Moth	Pupae	Larva

Fig. 1: Control of spiny bollworm larva, pupa and moth**.**

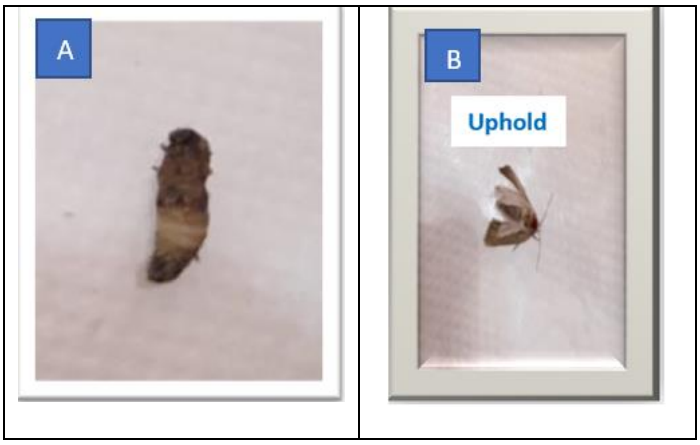


Fig. 2: Uphold deformation affect *E. insulana* pupae and moth
(A)-absence of the pupa cocoon. **(B)**-deformation in moth wings

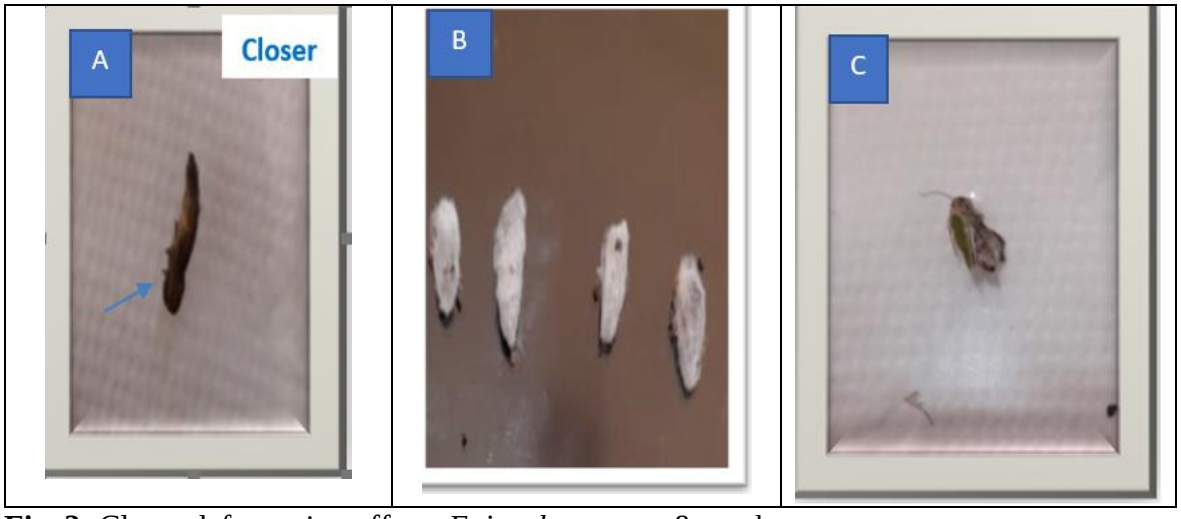


Fig. 3: Closer deformation affects *E. insulana* pupa & moth.
(A)-absence of the pupa cocoon **(B)**-thin layer of acoccon were formed and death the pupa inside it **(C)**-deformation in moth wings.

Ovipositonal Time:

The significant variance of results recorded in Table (5) is clear that the pre and post-oviposition time of emerged moth (female) result from treated with uphold and closer was highly significantly affected, it was increased to 3.6 and 4.0. But in the post-oviposition periods, it was shorted to 2.3 and 1.3 days/female, respectively, compared with 2.3 days in untreated. As well as, the latent effect of two compounds appearing on total eggs laid by moths. It high significant decrease to 116.0 and 58.0 eggs/female results from the two tested compounds uphold and closer, respectively, compared with199.0 eggs/ female in untreated (Table, 5). on the other hand, the latent effect appeared on a significant reduction of the percent hatchability (71.6 and 60,3 %) from the number of deposited eggs per each female (fertility) resulting from uphold and closer tested, respectively, compared with 94.3% eggs hatchability/ female in untreated.

Both sexes' Longevity:

Female *E. insulana* lived an average of 16.2 and 10.6 days, longer than males (10, 3 and 7.3) days when resulted from both tested to uphold and closer, respectively, compared with 16.5 days for females and 13.6 days/male in untreated. In addition; data clearly that highly significant difference between the two compounds and untreated (Table, 5).

Table 5: Ovipositonal time Fecundity and Fertility (%viable eggs) by *E. insulana* moth resulted from two compounds.

Examined stage	Conc. (ppm)	Ovipositional times /Female in days ± SE			Longevity in days ± SE		Fecundity and Fertility	
		Pre-oviposition	Oviposition	Post-oviposition	Female	Male	Total eggs deposited /♀	% Viable eggs
Uphold	1.090	3.6±0.2	12.3±6.1	2.3± 0.6	17.2± 0.	10.3±0.6	117.0±6.1	71.6
Closer	0.316	4.0±0.5	5.3±0.2	1. 3± 0.3	10.6± 0.	7.3±0.3	58.0± 6.1	60.3
Control	----	2.3±0.1	11.6±3.5	2.6±0.2	16.5± 0.	13.6± 0.6	199.0±7.5	94.3
LSD		0.461	1.335	0.117	1.643	1.863	12.761	6.337
P		**	**	*	**	**	**	**

Transaminase enzymes (GOT (ALT) and GPT (AST):

The biochemical data recorded in Table (6) showed that the transaminase enzyme activity in blood full grown larvae of *E. insulana* (10 days old after treatment) resulted from neonate larvae espoused and fed with uphold and closer. The levels of ALT increased nearly two times, estimated by 615.3 mg/ml, while, AST increased to 341.6 mg/ml with uphold treatment. On contrary, the highest reduction levels of ALT and AST activity on *E. insulana* larvae resulted from closer (101.00 and 364.00 mg/ml) compared with untreated (373.6 and 288.9 mg/ml, respectively).

Also, the result analyzed recorded in Table (6) clearly that the two compounds cussed the reduction in the N- acetyl- glucoseamine (µg NAGA /g.b. wt); which is necessary for chitin formation. The higher reduction was recorded by 97.6µg and 112.9 NAGA /g.b. wt) for both treatments, respectively, compared with 173.9 in normal pests (untreated).In addition, data in Table (6) show that the chitinase activity in *E. insulana* larvae treated with uphold and closer high decreased to which necessary for the molting proses to 46.97 and 58.19 compared to 87.8 µg NAGA x103/min/g.b.wt / larvae in control.

Table 6: Effect of uphold and closer on some biochemical analysis of *E. insulana*.

comp.	Conc (ppm)	Lipid (mg/g.b. wt)	Glucose (mg/g.b.wt)	Enzyme activity			
				Chitinase (µg NAGA x103/min/g.b.	N- acytel glucceamine (µg NAGA	(ALT) mg/ml	(AST) mg/ml
Uphold	1.090	6.93	29.41	46.97	97.6	615.3	341.6
Closer	0.316	4.31	26.80	58.19	112.9	101.0	264.0
Control	----	8.97	45.33	87.80	173.9	373.6	288.90
LSD		2.09	7.36	6.84		19.62	14.00
P		**	**	**	**	**	*

Histological Assay:

The data shown in Figures from (1 to 6) clearly that the effect of the pesticide compound (closer) on the midgut and fat body of *E. insulana* after 10 days from espoused and feeding on the compound compared with the control. The histological examination of untreated members of *E. insulana* larvae shown in Fig. I (1-3) it mainly clear that the normal midgut consists of one layer of epithelial cells resting on the basement membrane, the epithelial cells are composed of two main types of cells columnar and goblet cells. The number of goblet cells is numerous as the columnar cells in between the regenerative cells have little cytoplasm and the nuclei have condensed chromatin. The midgut lumen acquires microvilli at the brush border boundaries of epithelial cells. Fig.I (4-6) cleared that treatment with pesticide compound (closer) after ten days from espoused and feeding induced severe effects on the mid-gut, where they are regarded shrinkage in some epithelial cells and swelling of other cells presumably due to secretory activities. The brush border of epithelial cells was extensively damaged.

The histological structure of the normal fat bodies in Fig. II (1-3) indicated that they are composed of thin sheets or ribbons, usually only one or two cells thick, or of small nodules suspended in the hemocoel by connective tissue and tracheae. The histological changes caused by pesticide compound (closer) showed noticeable destruction of the fat body cells which lost their dramatics organized shape by vacuolization and extensive disorganization of fat cells as well as the destruction of the membranous sheath Fig.I(4-6). The current results are matched with (Zidan *et al*., 1998) which registered that (MPVII) led to morphological changes in the epithelial cell of the midgut of pink &spiny treated larvae and also found hypertrophied columnar cells in the epithelium on the midgut of the four instar larvae of *H. armigera* when treated with BTK(Rashmi and Singh(2004).

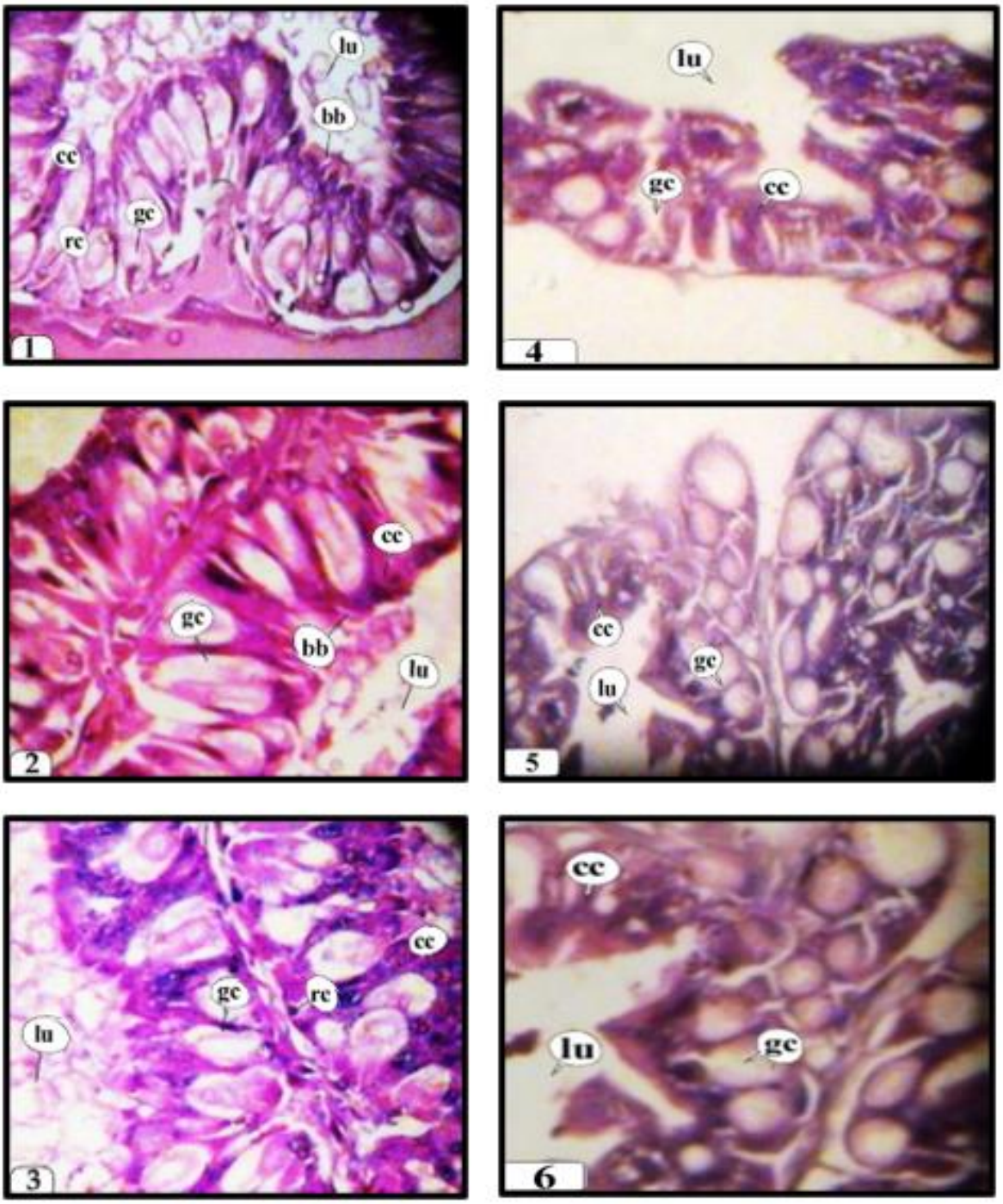


Plate 1: Figs 1-6. Different aspects of histology of mid-gut epithelium of untreated *E. insulana* larvae Vs treated with Closer Insecticide. The untreated mid-gut epithelium (Figs. 1-3) shows that the epithelial layer of midgut tissue appears as a corrugate wall composed of three distinct primary cell types: columnar (cc), goblet (gc), regenerative (rc), and the brush border (bb) is visible in facing the gut lumen (lu). In most sections, goblet cells have emerged as giant cells in the midgut epithelium of untreated larvae. The microscopic observations of the treated larvae (figs. 4-6) showed modifications in the mid-gut vs untreated. The microscopic observations of the treated larvae showed visible feature changes in volume, morphology and deformation in the midgut epithelium. The epithelial of the midgut appears flimsy and is dominated by asymmetrical and abnormal morphological formations of goblet cells compared to the untreated larvae, also the columnar cells, whose features looked debilitated.

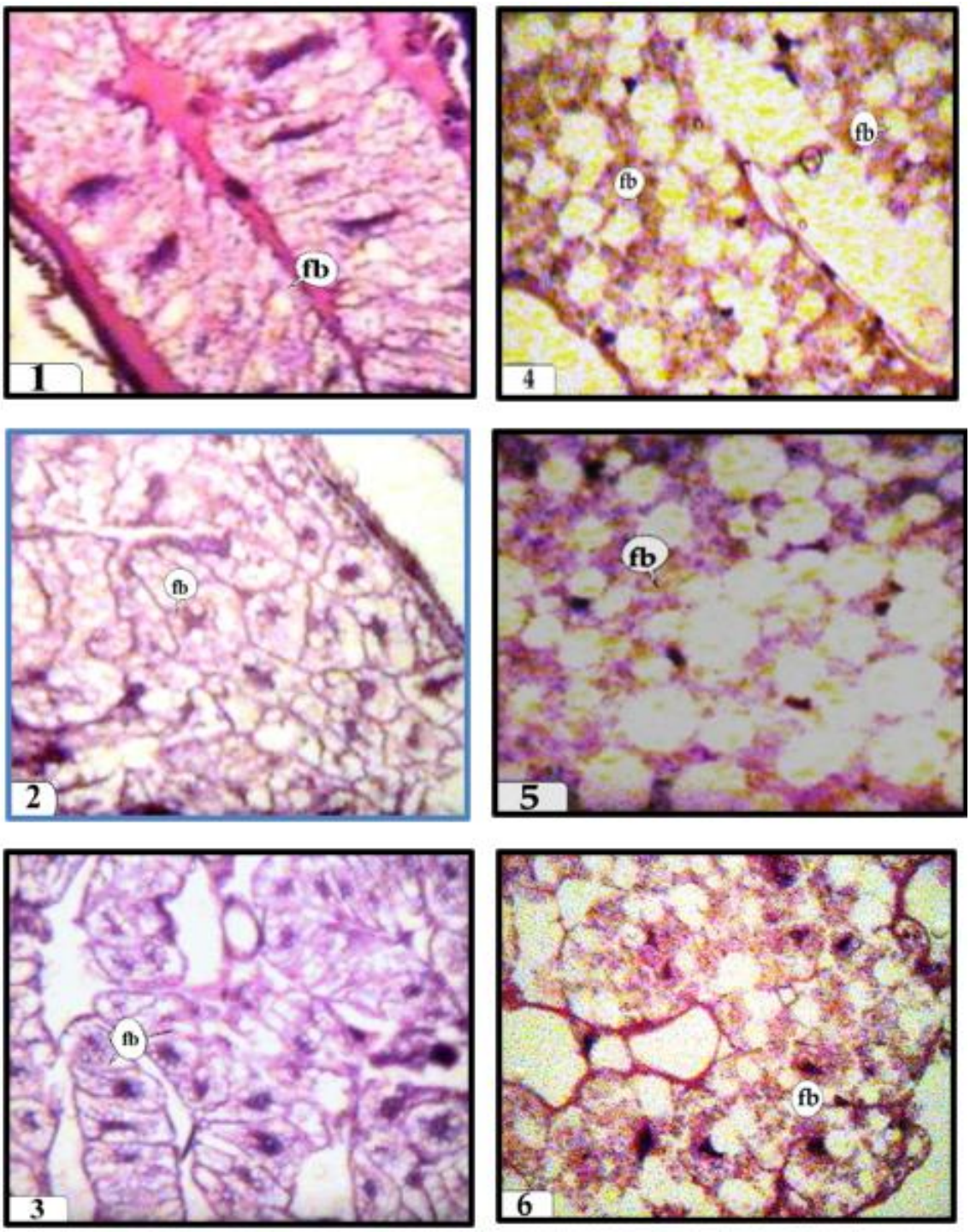


Plate II: Figs 1-6. The untreated *E. insulana* larvae's histological fat body features (figs. 1-3) showed that the fat body organizes in lobes of different thicknesses. The cells appeared as organized spheroid vacuoles. On the other hand, treated larvae with insecticide closer (figs. 4-6) revealed obliteration in the fat body cells, and havoc of morphological appearance was noticed compared to the control, where the fat body showed weak and minimal lobes. Histopathological profiles of the treated larvae morphologically, the lobes were uniform and showed a reticulated shape, and their cellular structure appeared not distinguished. Histopathological profiles of treated larvae morphologically produced lobes that were uniform and showed a reticulated shape, and their cellular structure appeared not distinguished. Several histopathological and ultrastructural studies have investigated the interaction between some compounds and the midgut of lepidopteran insect species**.**

DISCUSSION

The purpose of the experiment was to evaluate of direct exposed impact and estimated the assessment assay, of two tested insecticides Uphold and Closer belonging to two different groups of insecticide under laboratory conditions. It evaluation to can be possibility management target pest *E. insulana* (as a newly hatched larvae) and estimated the adverts' latent effect on different stages parameters. Generally, in this experiment, it is clear that *E. insulana* 1st instar was more sensitive when exposed to two tested insecticides than untreated larvae. *E. insulana*. The difference in mortality and toxicity LC_{50} values (0.316 ppm for closer and increased approximately three times 1.090 for uphold) larvae which observed depending on the mode of action of the two insecticides and toxicity values of active ingredient for these insecticides. The present results corroborate with the findings of (Bolognesi and Merlo 2011and Kandil, *et al.,* 2022). This mortality and toxicity result was in agreement with Rub *et al.,* (1984) the later author cleared the high percent mortality larvae at 1 x 103 ppm of Dimilin. Also, El- Kordy, (1985) recorded that a high rate of mortality was observed at 1000 ppm. Shalaby, (1994) reported that larval, pupal, and adult mortalities were 83%, 14 %, and 2% following treatment with 24 ppm of diflubenzuron.

Our results clear that the LC_{50} values of two tested compounds, Uphold and Closer increased the larval and pupal time durations of *E. insulana* to 25.3 and 20.6 days/larvae, respectively, compared with 15.2 days in untreated and the time required for pupal formed high increased to 11.6 and 14.6 days/pupa for Uphold and Closer, respectively, compared with 7.6 for untreated (check) the resulted agree with Reda, *et al.,* (2010) on *S. littoralis* and Shaurub, *et al.,* (2018) on *Agrotis ipsilon*, recorded a significant increase in the mean duration immature stags a result of larval treatment with LC_{50} of flufenoxuron (Cascade). Also, Moustafa and Salem (2019) found that cypermethrin and Flufenoxuron. Increased in different stages of development and the total immature duration resulted from treated newly hatched larvae of *Pectinophora gossypiella* (Saund).In addition, the present results of the biochemical, clear that the changes explain the relationship between the two insecticides treatment and reduction in all larval lipid, glucose enzymes and prolonged and / or faster with high elongated in duration which increased from 10 to 14 days than normal pest, The insect lipids increase by synthesis from food during larval stages(Cripps *et. al.*,1988) and a large store during pupa and changes in lipids store because of needed in flight and oviposition of the adult emergence (Gilby ,1965).all parameters recorded in the present study there's a relationship between change and reduction of total lipids and its effect on its mature and immature stages according to that we found in own results highly decreased in larval and pupal weight(Fig.2-3a) , deformed in pupa(especially absence of cocoon) & highly deformed in moths (especially in wings)(Fig. 2-3b) for two compounds due to highly reduction of total lipids compared with control(Fig.1), (Table(6). The reduction in some biochemical recorded by analysis especially glucose, as well as, the influence in GOT and GPT (by increased or decreased). It may be due to inhibition in the metabolism process in larvae as well as the reduction in weight, and reproductive potentiality of SBW adults resulted.in addition, we observed the relationship between the physiological were studied of two compounds. It is clear with Chitin is important for growth and development through a part of the old cuticle digested to synthesize a new cuticle for molting (Nation, 2008). Chitin has biosynthesis chitin found in the cuticular exoskeleton and other tissues while CHs2 is responsible for the biosynthesis of chitin associated with the epithelial cell of the midgut (merzendorfer, 2006). In additionally; chitinase is a hydrolytic enzyme function breakdown the glycosidic bonds of chitin which is responsible for regulating the chitin content in per trophic matrix of the insect midgut which is important for protecting midgut epithelial cells from the food particles abrasive, pathogen and digestive enzyme and insect gut chitinase

may help in increase the porosity of the per trophic matrix of the insect midgut according to (Hegedus *et al.*, 2009), on the other hand, N-acetylglucosamine are important for the structural component of in the insect cuticle and hindgut according to(Kramer and Muthukrishnan,2005). Assar *et al.,* (2016) they clear that the Teflubenzuron (IGR's) against 4th instar larvae of *Spodoptera littoralis,* caused a highly significant reduction in total lipids and chitinase hydrolyzing enzymes. The shape of fatty acid is related to development and diet strongly (Mauldin *et al.*, 1971), in our results; we obtained an inhibition in the development of the insect with a lack of desire to eat. Based on that, we did some histological studies on the fat bodies of the insect for closer compound to examine the changes of it.

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