

## The effects of azadirachtin and emamectin benzoate insecticides as organic pollutants on experimental rats

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### Abstract

The present study aimed to throw light on the efficiency of two insecticides, Azadirachtin and Emamectin Benzoate. Chemical components of serum blood and histopathological were examined by three different doses treated orally (1/100, 1/150 and 1/225 LD<sub>50</sub>) of adult mature male albino rats weighting (100-120) g for 60 days. The results showed that there were significant increases of ALT, AST, urea and creatinine in the treatment of Azadirachtin more than Emamectin Benzoate and control. On the other hand there were significant decreases in protein content in the treatment of Azadirachtin more than Emamectin Benzoate on comparison with control. Histological studies were certain of chemical analysis results. At the end all the results indicated the toxic nature of the Azadirachtin insecticide were more than Emamectin Benzoate on albino rats.

**Keywords:** Azadirachtin, Emamectin Benzoate, Toxicity, Kidney, Liver.

### Introduction

Analysis of pesticide residues plays an important role in food quality for evaluating food safety and possible risks to human health. Pesticide residues in food have historically lagged far behind many comparable hazards as a cause for public health concern and action (Correia *et al.*, 2000 and Eskenazi *et al.*, 2008). Pesticide residues contaminating food is the problem focused worldwide because of its direct implications on human health and international trade (Sanborn *et al.*, 2004).

Emamectin Benzoate (4-deoxy-4-epimethylamino-4-deoxy- vermectin B1 benzoate, is a macrocyclic lactone chemical that was synthesized from chemical modification of avermectin B1. Emamectin Benzoate is a mixture of two analogs (B1a:B1b, 9:1), which differ by one methylene (CH<sub>2</sub>) unit on the C-25 side chain, where in B1a contains a sec -butyl group and B1b contains an isopropyl group (Kang *et al.* 2001). Azadirachtin is a limonoid secondary metabolite (C<sub>35</sub>H<sub>44</sub>O<sub>16</sub>), a tetra nortri terpenoid) of the Indian Neem tree (*Azadirachta indica* A. Juss). It is extracted from the soft pressed neem kernels (neem cake) after appropriate solvent extraction, and is available as a yellowish brown powder (technical grade Azadirachtin) at concentration of 12–26% (Immaraju, 1998 and Seljasena and Meadow, 2006). This technical grade material is used for the production of a wide range of commercial formulations exhibiting good efficacy against more than 400 insect species (Sharma *et al.*, 2006 and Ishaaya *et al.*, 2007).

Proteins are important organic substances required by organisms in tissue building and play an important role energy metabolism (Pang-Hang *et al.*, 2008).

The aim of this study is to evaluate effects of Azadirachtin and Emamectin Benzoate on experimental rats by three different doses which include, liver functions, kidney functions and histopathological examination of liver and kidney were studied.

### Materials and Methods

Diagnostic kits were obtained from Bio-Merieux Laboratory Reagents and Products, France, were used for determination of serum urea, creatinine, uric acid, total protein, albumin, Globulin, A/G ratio, ALP and transaminase (AST, ALT). All chemical used in this study were analytical grade.

The pesticides, Azadirachtin and Emamectin Benzoate were used and obtained from the plant protection Research Institute (Dokki, Giza, Egypt).

### Experimental animal:

The present work was under taken to study the effect of insecticides on chemical components of blood and histopathological examination of albino rats. A total of 42 adult mature male albino rats, weighting (100-120 g) were used in the present study. They were fed in the animal house (National Research Center) Giza- Egypt.

### Animal Grouping:

Animals were classified into 7 groups of 6 rats each composed as Follows:

**Group (1):** Without treatment and kept as a control.

**Group (2):** Administered orally 1/100 LD<sub>50</sub> of Azadirachtin (50 mg/kg, B.wt) day after day for two months (60 days).

**Group (3):** Administered orally 1/150 LD<sub>50</sub> of Azadirachtin (33.3 mg/kg B.wt).

**Group (4):** Administered orally 1/225 LD<sub>50</sub> of Azadirachtin (22.2 mg/kg b.wt).

**Group (5):** Administered orally 1/100 LD<sub>50</sub> of Emamectin Benzoate (15 mg/kg B.wt).

**Group (6):** Administered orally 1/150 LD<sub>50</sub> of Emamectin Benzoate (10mg/kg B.wt.).

**Group (7):** was administered orally 1/225 LD<sub>50</sub> of Emamectin Benzoate (6, 7 mg/kg B.wt.).

Blood samples were collected into a plain tube for serum preparation and assay of the chemical parameter of blood samples included liver and kidney function testes.

At the end of the experiment the rats were scarified and the post mortem findings were recorded. Autopsy samples were taken from the liver, kidney and pancreas of rats in different groups and fixed in 10% formal saline 24 h. The obtained tissue sections were collected on glass slides, deparaffinized and stained by hematoxylin and eosin stain then examined through the electric light microscope (Banchroft *et al.*, 1996). Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) activities were measured according to the method described by Reitman and Frankel (1957). Serum alkaline phosphatase was determined according to the method described by Tietz *et al.* (1983). Serum total proteins were determined by method performed by Doumas (1975). Serum albumin and globulin were determined according to the method described by Doumas *et al.* (1971). Urea levels were determined according to the method described by Tabacco *et al.* (1979). Creatinine levels content were determined according to the method described by Henery *et al.* (1974). Serum uric acid was determined using Enzymatic-colorimetric method according to (Haisman and Muller, 1977).

#### Statistical analysis:

The statistical analysis was carried out carried out using ANOVA with one factor under significance level of 0.05 for the whole results using SPSS var. 19 and data were treated as complete randomization design according to Steel *et al.* (1997). Multiple comparisons were carried out applying LSD and Duncan.

### Results and Discussion

#### 1. Biochemical effects of Azadirachtin and Emamectin Benzoate on experimental rats:

##### 1.1. Effect of Azadirachtin and Emamectin Benzoate on liver function:

The effect of oral administration of Azadirachtin and Emamectin Benzoate residues on activities of liver enzymes (AST, ALT, and ALP) of rats were investigated and the obtained results are tabulated in Table (1).

From the results, it could be observed that the enzyme activities in serum of the control rats group were found to be (6.00±0.37, 5.83±0.48 and 110.83±4.36 IU/ml after two months for ASL, ALT and ALP, respectively.

The serum AST, ALT and ALP activities of Azadirachtin in G2, G3 and G4 were found to be (27.20±0.79, 21.40±.76 and 18.83±1.01 IU/ml) for AST, (41.8±0.87, 30.00±1.24 and 25.83±1.14 IU/ml) for ALT, (221.00±5.23, 198.00±4.20 and 165.83±4.17IU/l) for ALP, respectively. These results were significantly increased compared with G1 (control). While the serum AST ALT and ALP activities of Emamectin Benzoate in G5, G6 and G7 were found to be (17.83±0.70, 11.00±0.37 and 9.00±0.37 IU/ml) for AST. (24.33±0.76, 11.00±0.77 and 9.83±0.60 IU/ml) for ALT and (185.83±7.12, 177.50±8.34 and 145.83±6.88 IU/ml) for ALP, respectively. These results significantly increased compared with G1 (control). But the mean values of serum transaminase activities of AST, ALT and ALP showed insignificant increase in Azadirachtin more than Emamectin Benzoate and control. These results are in agreement with those reported by Dafalla *et al.* (2012), Hassina *et al.* (2013), Abdel-Hafez and Osman (2013) and Baligar *et al.* (2014).

##### 1.2. Effect of Azadirachtin and Emamectin Benzoate on serum total proteins, albumin, and globulin and A/G ratio of rats serum

The mean values of serum total proteins, albumin, globulin and A/G ratio of rats were assayed and the obtained data are presented in Table (2).

**Table 1.** Effect of Azadirachtin and Emamectin Benzoate residues on liver function of experimental rats.

Parameter	Period for dose	Control		Azadirachtin			Emamectin Benzoate		
		G1	G2	G3	G4	G5	G6	G7	
AST (IU/l)	Before	5.67±0.33 <sup>aBC</sup>	6.33±0.88 <sup>aC</sup>	5.67±0.88 <sup>aBC</sup>	5.33±0.88 <sup>aBC</sup>	5.67±0.88 <sup>aBC</sup>	3.67±0.88 <sup>aA</sup>	4.67±0.88 <sup>aAB</sup>	
	After	6.00±0.37 <sup>aA</sup>	27.20±0.79 <sup>bF</sup>	21.40±0.76 <sup>bE</sup>	18.83±1.01 <sup>bD</sup>	17.83±0.70 <sup>bD</sup>	11.00±0.37 <sup>bC</sup>	9.00±0.37 <sup>bB</sup>	
ALT (IU/l)	Before	3.00±0.58 <sup>aA</sup>	6.33±0.67 <sup>aC</sup>	4.67±0.33 <sup>aB</sup>	8.33±0.88 <sup>D</sup>	5.00±1.15 <sup>aBC</sup>	5.33±1.20 <sup>aBC</sup>	3.00±0.58 <sup>aA</sup>	
	After	5.83±0.48 <sup>bA</sup>	41.8±0.87 <sup>bE</sup>	30.00±1.24 <sup>bD</sup>	25.83±1.14 <sup>bC</sup>	24.33±0.76 <sup>bC</sup>	11.00±0.77 <sup>bB</sup>	9.83±0.60 <sup>bB</sup>	
ALP (IU/l)	Before	100.00±2.52 <sup>aA</sup>	116.67±4.41 <sup>aCD</sup>	101.00±2.08 <sup>aAB</sup>	103.33±1.67 <sup>aAB</sup>	125.00±7.64 <sup>aD</sup>	114.33±7.88 <sup>aCD</sup>	111.33±6.33 <sup>aBC</sup>	
	After	110.83±4.36 <sup>bA</sup>	221.00±5.23 <sup>bF</sup>	198.00±4.20 <sup>bE</sup>	165.83±4.17 <sup>bC</sup>	185.83±7.12 <sup>bD</sup>	177.50±8.34 <sup>bD</sup>	145.83±6.88 <sup>bB</sup>	

a, b & c: There is no significant difference ( $P>0.05$ ) between any two means, within the same column have the same superscript letter.

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All values were expressed as mean  $\pm$ SE (six rats)

SE: Stander error

Before: Zero time

After: End time (two months).

G1: Control (normal diet).

G3: Administrated orally 1/150 LD<sub>50</sub> of Azadirachtin.

G5: Administrated orally 1/100 LD<sub>50</sub> of Emamectin Benzoate.

G7: Administrated orally 1/225 LD<sub>50</sub> of Emamectin benzoate.

G2: Administrated orally 1/100 LD<sub>50</sub> of Azadirachtin.

G4: Administrated orally 1/225 LD<sub>50</sub> of Azadirachtin.

G6: Administrated orally 1/150 LD<sub>50</sub> of Emamectin Benzoate.

**Table 2.** Effect of Azadirachtin and Emamectin Benzoate residues on serum total protein, albumin and globulin of experimental rats.

Parameter	Period for dose	Control		Azadirachtin		Emamectin Benzoate		
		G1	G2	G3	G4	G5	G6	G7
Total protein (g/dl)	Before	7.20±0.15 <sup>bb</sup>	6.97±0.12 <sup>bAD</sup>	6.77±0.15 <sup>aAD</sup>	7.47±0.12 <sup>bC</sup>	7.30±0.20 <sup>bBC</sup>	7.27±0.15 <sup>bBC</sup>	7.40±0.21 <sup>bBC</sup>
	After	6.95±0.09 <sup>aCD</sup>	6.72±0.07 <sup>aAB</sup>	6.92±0.12 <sup>bBC</sup>	7.27±0.14 <sup>aE</sup>	6.63±0.09 <sup>aA</sup>	7.15±0.08 <sup>aDE</sup>	7.02±0.03 <sup>aCD</sup>
Albumin (g/dl)	Before	4.37±0.09 <sup>ba</sup>	4.63±0.09 <sup>bb</sup>	4.20±0.17 <sup>ba</sup>	4.70±0.21 <sup>bBC</sup>	4.57±0.09 <sup>bb</sup>	4.60±0.23 <sup>bb</sup>	4.80±0.15 <sup>bC</sup>
	After	4.18±0.10 <sup>aE</sup>	3.06±0.06 <sup>aA</sup>	3.36±0.04 <sup>aC</sup>	3.98±0.08 <sup>aD</sup>	3.20±0.04 <sup>aAC</sup>	3.87±0.13 <sup>aD</sup>	4.20±0.12 <sup>aE</sup>
Globulin (g/dl)	Before	2.83±0.09 <sup>aD</sup>	2.33±0.03 <sup>aA</sup>	2.57±0.27 <sup>aABC</sup>	2.77±0.19 <sup>aCD</sup>	2.40±0.06 <sup>aAB</sup>	2.67±0.09 <sup>aC</sup>	2.60±0.20 <sup>aB</sup>
	After	2.77±0.12 <sup>aA</sup>	3.66±0.05 <sup>bC</sup>	3.56±0.13 <sup>bb</sup>	3.28±0.20 <sup>bb</sup>	3.43±0.07 <sup>bBC</sup>	3.28±0.13 <sup>bb</sup>	2.87±0.08 <sup>ba</sup>
A/G ratio	Before	1.53±0.04 <sup>aA</sup>	1.98±0.02 <sup>bC</sup>	1.67±0.21 <sup>baB</sup>	1.72±0.19 <sup>baB</sup>	2.07±0.24 <sup>bC</sup>	1.73±0.15 <sup>baB</sup>	1.86±0.16 <sup>bBC</sup>
	After	1.53±0.09 <sup>aC</sup>	1.00±0.16 <sup>aA</sup>	0.95±0.04 <sup>aA</sup>	1.24±0.10 <sup>aB</sup>	0.93±0.02 <sup>aA</sup>	1.19±0.08 <sup>aB</sup>	1.51±0.11 <sup>aC</sup>

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All values were expressed as mean  $\pm$ SE (six rats)

SE: Stander error

Before: Zero time

After: End time (two months).

G1: Control (normal diet).

G3: Administrated orally 1/150 LD<sub>50</sub> of Azadirachtin.

G5: Administrated orally 1/100 LD<sub>50</sub> of Emamectin Benzoate.

G7: Administrated orally 1/225 LD<sub>50</sub> of Emamectin benzoate.

G2: Administrated orally 1/100 LD<sub>50</sub> of Azadirachtin.

G4: Administrated orally 1/225 LD<sub>50</sub> of Azadirachtin.

G6: Administrated orally 1/150 LD<sub>50</sub> of Emamectin Benzoate.

From the obtained results of the G1 (control) were found to be 6.95±0.09, 4.18±0.10, 2.77±0.12 and 1.53±0.09 g/dl, respectively, after two months. While, the result in G2 and G5 were significantly decreased compared with control group and other groups were non-significant differentiation comparing with control rats group.

From the same table, the mean values of albumin and A/G ratio in all groups were significantly decreased compared with G1 (control). But the mean values of globulin in all groups were significantly increased compared with G1 (control).

These results are in agreement with those reported by **Abdel-Hafez and Osman (2013)**, **Hassina et al. (2013)** and **Baligar et al. (2014)**.

### 1.3 Effect of Azadirachtin and Emamectin Benzoate residues on kidney function of rats.

Serum creatinine, urea and uric acid experimental rats oral administration of both Emamectin Benzoate and Azadirachtin were determined as indicators of kidney function, since the increase in these

parameters means that the kidney is less active or there is an abnormality has been occurred. The obtained results recorded in Table (3).

From the obtained results of creatinine, urea and uric acid parameters were found to be 0.73±0.04, 19.67±1.20 and 4.28±0.11 mg/dl for rats fed diets control, respectively. From the obtained data, it could be observed that the results of creatinine, urea and uric acid were found to be significantly increased of all groups which administrated by Emamectin Benzoate and Azadirachtin at different doses if compared with control group except G4 which showed that relatively small differences. On the other hand, the results of creatinine, urea and uric acid showed a significant increase in Azadirachtin more than Emamectin Benzoate and control. Therefore, the results of Emamectin Benzoate were lower toxic than Azadirachtin on creatinine, urea and uric acid for experimental rats. These results are in agreement with those reported by **Abdel-Hafez and Osman (2013)** and **Baligar et al. (2014)**.

**Table 3.** Effect of Azadirachtin and Emamectin Benzoate residues on kidney function of experimental rats.

Parameter	Period for dose	Control		Azadirachtin		Emamectin Benzoate		
		G1	G2	G3	G4	G5	G6	G7
Creatinine (mg/dl)	Before	0.63±0.09 <sup>aAB</sup>	0.83±0.09 <sup>aD</sup>	0.73±0.12 <sup>aB</sup>	0.60±0.06 <sup>aA</sup>	0.63±0.09 <sup>aAB</sup>	0.67±0.03 <sup>aABC</sup>	0.77±0.15 <sup>aCD</sup>
	After	0.73±0.04 <sup>ba</sup>	1.63±0.06 <sup>be</sup>	1.44±0.04 <sup>bd</sup>	1.23±0.06 <sup>bc</sup>	1.47±0.04 <sup>bd</sup>	1.27±0.03 <sup>bc</sup>	1.07±0.05 <sup>bb</sup>
Urea (mg/dl)	Before	14.67±0.88 <sup>aA</sup>	20.67±1.76 <sup>aC</sup>	25.33±1.45 <sup>aD</sup>	15.33±1.20 <sup>aAB</sup>	17.33±1.76 <sup>aB</sup>	16.67±2.03 <sup>aAB</sup>	17.67±3.18 <sup>aB</sup>
	After	19.67±1.20 <sup>ba</sup>	60.33±0.76 <sup>bf</sup>	48.67±0.49 <sup>be</sup>	35.17±1.47 <sup>bc</sup>	48.67±1.31 <sup>be</sup>	42.17±1.66 <sup>bd</sup>	30.83±1.64 <sup>bb</sup>
Uric acid (mg/dl)	Before	4.03±0.15 <sup>aC</sup>	3.77±0.15 <sup>aAB</sup>	3.60±0.12 <sup>aA</sup>	3.87±0.09 <sup>aB</sup>	4.07±0.12 <sup>aC</sup>	4.47±0.09 <sup>aD</sup>	3.63±0.15 <sup>aA</sup>
	After	4.28±0.11 <sup>ba</sup>	6.93±0.14 <sup>bf</sup>	6.40±0.14 <sup>be</sup>	5.87±0.11 <sup>bd</sup>	5.70±0.09 <sup>bd</sup>	5.10±0.06 <sup>bc</sup>	4.48±0.13 <sup>bb</sup>

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All values were expressed as mean±SE (six rats)

SE: Stander error

Before: Zero time

After: End time (two months).

G1: Control (normal diet).

G3: Administrated orally 1/150 LD<sub>50</sub> of Azadirachtin.

G5: Administrated orally 1/100 LD<sub>50</sub> of Emamectin Benzoate.

G7: Administrated orally 1/225 LD<sub>50</sub> of Emamectin Benzoate.

G2: Administrated orally 1/100 LD<sub>50</sub> of Azadirachtin.

G4: Administrated orally 1/225 LD<sub>50</sub> of Azadirachtin.

G6: Administrated orally 1/150 LD<sub>50</sub> of Emamectin Benzoate.

### 2. Effect of Azadirachtin and Emamectin Benzoate residues on body weight of experimental rats.

Initial body weight and final body weight of rats administrated orally different doses of Emamectin Benzoate and Azadirachtin (1/100 LD<sub>50</sub>, 1/150 LD<sub>50</sub> and 1/225LD<sub>50</sub> of each) were recorded during first week and end of experimental period (8 week). From the data presented in Table (6). It is clear that, the initial average weight (g) of rats were found to be (109.17) for control group. While, these values were (114.17), (111.67) and (111.67), with 1/100 LD<sub>50</sub>, 1/150LD<sub>50</sub> and 1/225 LD<sub>50</sub> of Azadirachtin and (112.50), (112.50) and (117.50) with the same dose of Emamectin Benzoate, respectively. The obtained data showed that rats fed normal basal diet had the highest total final body weight (g) which increased

from (109.17) to (261.67) after eight weeks. While, the final body weights (g) of rats administrated orally of Emamectin Benzoate at the doses of (1/100 LD<sub>50</sub>, 1/150 LD<sub>50</sub> and 1/1225 LD<sub>50</sub>) were increased from (114.17) to (215.0), (111.67) to (226.67) and (111.67) to (233.33), respectively, and the final body weight of rats administrated orally of Azadirachtin at the same dose, were increased from (112.50), to (208.00), (112.50) to (196.0) and (117.50) to (203.33) respectively, at end of experimental period (8 week). On the other hand, the increase values(g) and changes (%) of body weights of rats for control group were (152.50) and (140.66). while the increase values (g) and changes (%) of body weights of rats administrated orally of Emamectin Benzoate at the dose of (1/100 LD<sub>50</sub>, 1/150 LD<sub>50</sub> and 1/225 LD<sub>50</sub>) were (100.83) and (88.64), (115.0) and (104.21) and

(121.67) and (110.25). respectively, while, the increase values(g) and changes(%) of body weights of rats administrated orally of Azadirachtin at the same dose were (95.50) and (84.99),(83.50) and (74.49) and (85.83) and (73.24) respectively, at end of experimental period (two months).

From the obtained results, could be noticed that the increasement and changes (%) of body weights of rats for Emamectin Benzoate and Azadirachtin group

had lower of control Group while, the increase and changes (%) of body weights of rats for Emamectin Benzoate groups were higher of Azadirachtin. These results are in agreement with those reported by **Hassina *et al.* (2013)**. So the results of Emamectin Benzoate were best of Azadirachtin of effect on body weight, experimental rats. So the Emamectin Benzoates were lower toxic than Azadirachtin on body weights of experimental rats.

**Table 4.** Effect of Azadirachtin and Emamectin Benzoate on body weight of experimental rats.

Weight	Control		Azadirachtin		Emamectin Benzoate		
	G1	G2	G3	G4	G5	G6	G7
Initial (g)	109.17	112.50	112.50	117.50	114.17	111.67	111.67
Final (g)	261.67	208.00	196.00	203.33	215.00	226.67	233.33
Increase (g)	152.50	95.50	83.50	85.83	100.83	115.00	121.67
Changes (%)	140.66	84.99	74.49	73.24	88.64	104.21	110.25

G1: Control (normal diet).

G3: Administrated orally 1/150 LD<sub>50</sub> of Azadirachtin.

G5: Administrated orally 1/100 LD<sub>50</sub> of Emamectin Benzoate.

G7: Administrated orally 1/225 LD<sub>50</sub> of Emamectin Benzoate.

G2: Administrated orally 1/100 LD<sub>50</sub> of Azadirachtin.

G4: Administrated orally 1/225 LD<sub>50</sub> of Azadirachtin.

G6: Administrated orally 1/150 LD<sub>50</sub> of Emamectin Benzoate.

### 3. Histopathological findings:

#### 4.1 Histopathological examination of rats' liver:

**Group (1):** The microscopic examination of the liver of rats in control group revealed nearly histologic hepatic tissues. There was no histopathological alteration observed and the normal histological structure of the central vein and surrounding hepatocytes in the parconchyma were recorded in (Fig. 1A).

**Group (2):** The microscopic examination of the liver of rats administrated orally 1/100 LD<sub>50</sub> of Azadirachtin (50 mg/kg B.wt). Congestion was detected in the central vein and sinusoids associated with apoptosis in some individual hepatocytes in association with focal inflammatory cells infiltration in the hepatic parenchyma (Fig. 1B).

**Group (3):** The liver of rats administrated orally 1/150 LD<sub>50</sub> of Azadirachtin (33.3 mg/kg B.wt). The portal area showed congestion in the portal vein associated with few inflammatory cells infiltration surrounding the bile ducts (Fig. 1C).

**Group (4):** The liver of rats administrated orally 1/225 LD<sub>50</sub> of Azadirachtin (22.2 mg/kg B.wt). The portal area showed congestion in the portal vein associated periductal fibrosis surrounding the formed bile ducts (Fig. 1D).

**Group (5):** The liver of rats administrated orally 1/100 LD<sub>50</sub> of Emamectin Benzoate (15 mg/kg B.wt). There were dilatation and congestion in the central and portal veins (Fig.34). Focal inflammatory cells infiltration was detected in the portal area surrounding the dilated portal vein (Fig. 1E).

**Group (6):** The liver of rats administrated orally 1/150 LD<sub>50</sub> of Emamectin Benzoate (10 mg/kg B.wt). Congestion was noticed in the portal vein (Fig. 1F).

**Group (7):** The histopathological examination of the liver of rats administrated orally 1/225 LD<sub>50</sub> of

Emamectin Benzoate (6.7mg/kg B.wt).Dilatation and congestion were noticed in the central vein (Fig. 1G).

#### 4.2. Histopathological examination of rat's kidney:

**Group (1):** The microscopic examination of the kidneys of rats fed on basal diet showed normal histological structure of the renal tissues. There was no histopathological alteration observed and the normal histological structure of the glomeruli and tubules at the cortex were recorded in (Fig. 2A).

**Group (2):** The microscopic examination of the kidney of rats administrated orally 1/100 LD<sub>50</sub> of Azadirachtin (50 mg B.wt). There was congestion in the cortical blood vessels (Fig. 2B).

**Group (3):** The kidney of rats administrated orally 1/150 LD<sub>50</sub> of Azadirachtin (33.3 mg/kg B.wt).Congestion was detected in the cortical blood vessels (Fig. 2C).

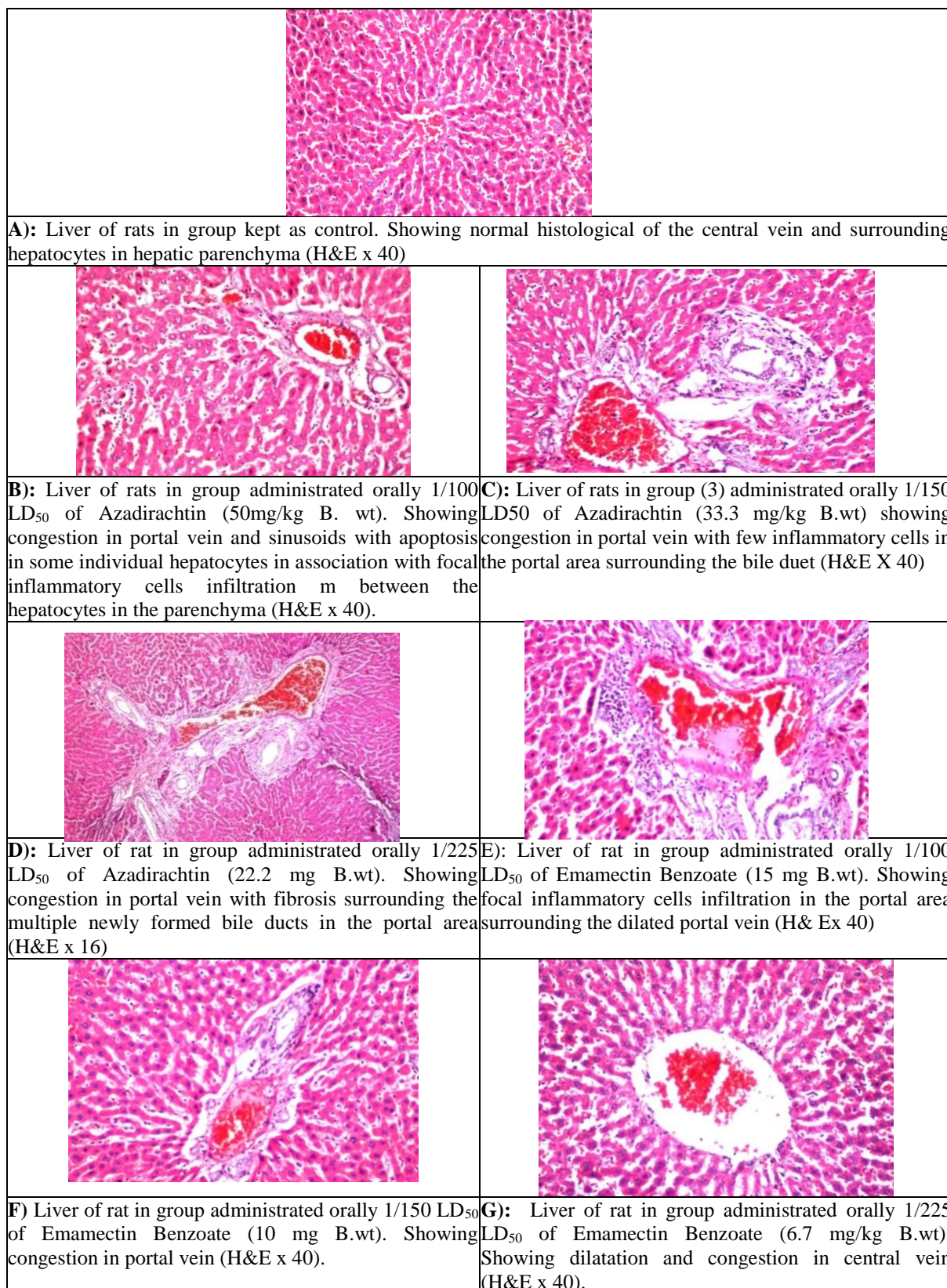
**Group (4):** The kidney of rats administrated orally 1/225 LD<sub>50</sub> of Azadirachtin (22.2 mg /kg B.wt). Congestion was observed in the cortical blood vessels (Fig. 2D).

**Group (5):** The kidney of rats administrated orally 1/100 LD<sub>50</sub> of Emamectin Benzoate (15 mg B.wt). There was no histopathological alteration as recorded in (Fig. 2E).

**Group (6):** The kidney of rats administrated orally 1/150 LD<sub>50</sub> of Emamectin Benzoate (10 mg B.wt). There was mild congestion in the cortical blood vessels (Fig. 2F).

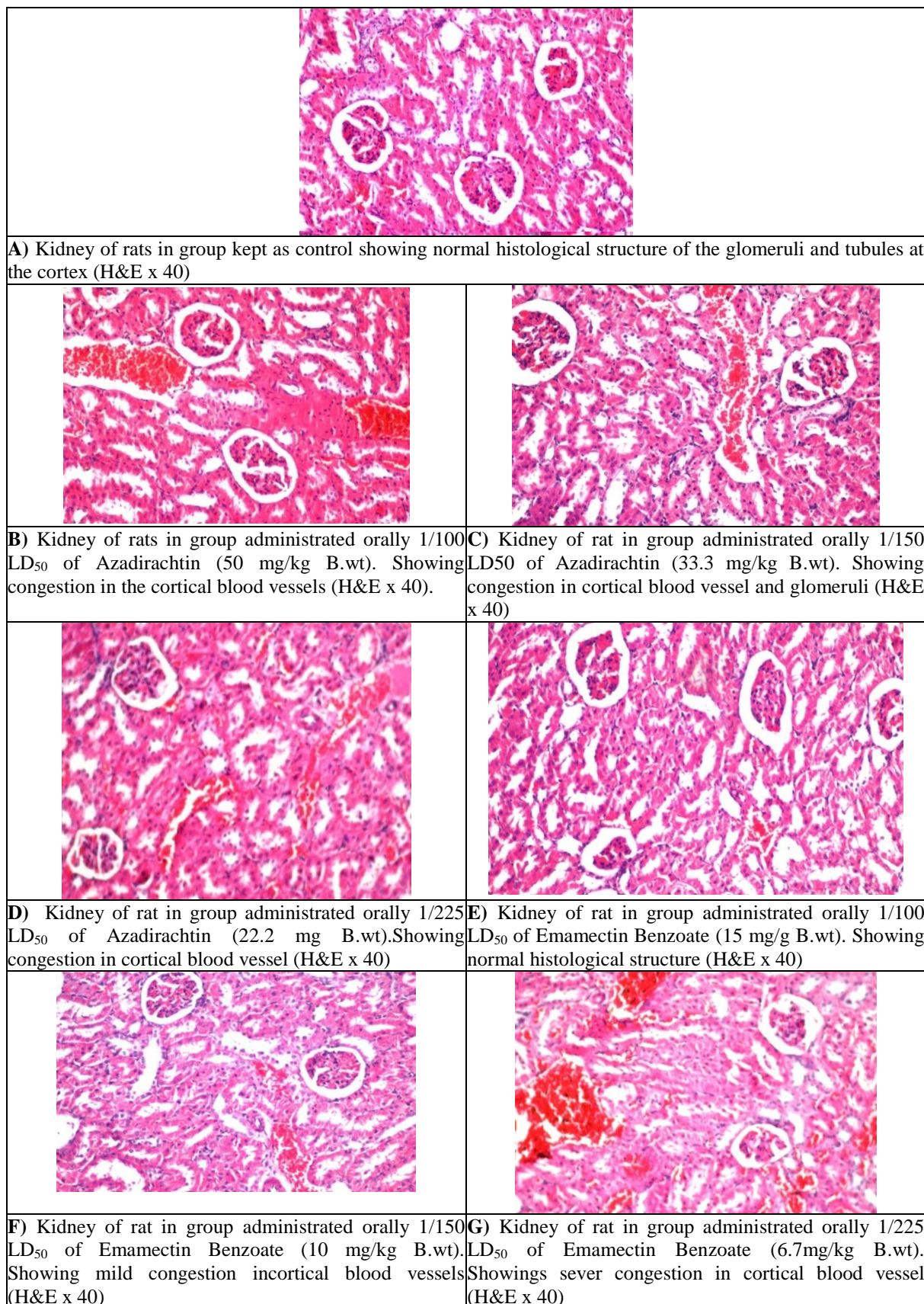
**Group (7):** The histopathological examination of the kidney of rats administrated orally 1/225 LD<sub>50</sub> of Emamectin Benzoate (6.7mg/kg B.wt) There was sever congestion in the cortical blood vessels (Fig. 2G).

So we suggest that usage of Emamectin Benzoate because it less toxic to environment safety.



**Fig. (1A-G):** Liver of rats in group administrated orally Azadirachtin and Emamectin Benzoate.





**Fig. (2A-G):** Kidney of rats in group administrated orally Azadirachtin and Emamectin Benzoate.



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تأثير مبيدات الازاديراكيتين والايمامكتين بنزوات كملوثات عضوية على فنران التجارب

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هدفت الدراسة لالقاء الضوء لدراسة كفاءة مركبين وهما الازاديراكيتين والايمامكتين بنزوات وهو احدى مشتقات المنتج الطبيعى الالبامكتين على فأر الالبينو ودراسة عوامل الامان لكلا من المركبين . وقد اجريت التجارب لمعرفة التأثير السام للمركبين .تم دراسة تأثير التسمم تحت المزمى على ذكور الفئران بتجريب عدد (42) فأر بالغ وزنها (100-120جم) تم تقسيمها الى سبعة مجموعات. الاولى تركت بدون معاملة (كنترول)، المجموعات الثانية والثالثة والرابعة تم تجريبها بمبيد الازاديراكيتين(100/1، 150/1، 225/1) من الجرعة النصفية المميتة. والمجموعات الخامسة والسادسة والسابعة تم تجريبها بمبيد الايمامكتين بنزوات بنفس الجرعات (100/1، 150/1، 225/1) من الجرعة النصفية المميتة لمدة60 يوم. وفي نهاية مدة التجربة تم ذبح الفئران وتجميع الدم منها وفصل السيرم للفحوص البيوكيميائية والهيماطولوجي والتغيرات الهستوباثولوجية.

وأوضحت نتائج الفحوص البيوكيميائية وجود زيادة معنوية في نشاط انزيمات الكبد (AST, ALT, ALP) بالدم لمبيد الازاديراكيتين عن الايمامكتين بنزوات مقارنة بالكنترول. وكذلك انخفاض معنوي في مستويات البروتين الكلى والالبومين والجلوبولين ومستوى الالبومين الى الجلوبيولين في مصل الدم للزاديراكيتين عن الايمامكتين بنزوات مقارنة بالمجموعة الضابطة (الكنترول). وبخصوص التأثير على وظائف الكلى فقد لوحظ ارتفاع معنوي في مستويات الكرياتين واليوريا واليوريك اسيد في مصل الدم لمجموعات الازاديراكيتين عن الايمامكتين بنزوات مقارنة (بالكنترول). أما بخصوص الدراسة الهستوباثولوجية للكبد والكلى فقد اكدت كل النتائج السابقة المتحصل عليها. وظهرت النتائج ان مركب الازاديراكيتين اكثر سمية من تأثير الايمامكتين بنزوات. وفي النهاية فقد لوحظ أن مبيد الايمامكتين بنزوات أقل ضرر من الازاديراكيتين على الفئران كما أنه أقل سمية. وتحت هذه الدراسة على الاهتمام بمعالجة مشكلة التلوث البيئي الناتج عن استعمال المبيدات الحشرية الزراعية لما لها من تأثير ضار على الاعضاء المختلفة للانسان والحيوانات التى يتغذى عليها الانسان وكذلك الحد من الاسراف فى استخدام هذه المبيدات واضافتها او استخدامها فى الحدود المسموح بها صحيا.