Original Article
ISSN (Print) : 0971-6580
Toxicology International, *Vol 25(1), 59–67, January-March 2018, DOI: 10.18311/ti/2018/v25i1/21413* *ISSN (Online) : 0976-5131*

Alteration of Serum Biochemical Parameters Due to Cow Urine Distillate in Triazophos Intoxicated White Leghorn Cockerels

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Abstract

In this study twenty five white leghorn male chicken of one month and one week old weighing about 244 to 248 gms were procured and were kept at Instructional Poultry Farm Nagla, Pantnagar. The birds in poultry shed were reared in deep litter system, were kept under standard managemental conditions and were randomly divided into five groups of 5 birds each. After one week of adaptation period, different doses of Triazophos were administered via feed at 2.5, 5 ppm level and cow urine distillate was administered via feed. At 2.5, 5 ppm level and cow urine distillate was administered through drinking water at the rate of 1ml per bird per day to groups G4, G5 respectively for 100 days daily. White leghorn cockerels are layers not broilers and can sustain for a period of 2-3 years. The birds of group "G1" served as control. After every 25 days blood was taken from each bird including day zero for study of different. viz. glucose, total protein, albumin, globulin, cholesterol, creatinine, uric acid, alanine aminotransferase ALT and aspartate aminotransferase AST.

Total protein, Albumin, globulin, parameters showed significant ($P<0.01$) decrease while in Cholesterol, Creatinine, Glucose, Uric Acid, ALT, AST showed a significant increase ($P<0.01$) in different doses of Triazophos treated birds in comparison to birds of control group while a significant increase ($P<0.01$) in Total protein, Albumin, globulin and a significant decrease ($P<0.01$) Cholesterol, Creatinine, Glucose, Uric Acid, ALT, AST was observed in cow urine treated groups (G4, G5) as compared to non cow urine treated groups (G2 and G3).

Keywords: Alanine Aminotransferase ALT, Aspartate Aminotransferase AST Test, Albumin, Cholesterol, Creatinine, Globulin, Glucose, Total Protein, Triazophos Toxicity, White Leghorn Cockerels, Uric Acid

1. Introduction

Pesticides have undoubtedly revolutionized farming practices and have facilitated the shift from small scale, self sufficient and diversified agriculture to industrial mono cropping. In India the systematic use of synthetic pesticides in crop commenced with DDT and BHC around 1947-48. The total consumption of technical grade pesticide had reached to approximately 381 gms per hectare on WHO[1] had estimated that world wide exposure to pesticides resulted in 3 million cases of acute poisoning and 2,20,000 deaths annually[2]. Pesticides on the basis of mode of action are categorized into insecticides, fungicides, nematicides, herbicides, weedicides, rodenticides and on the basis of their chemical nature into organophosphate, organochlorine, synthetic pyretheroids and carbamates. Organophosphates which are commonly used as pesticides are highly toxic and pose serious threat for animal and human health. These compounds produce toxicity directly by inhibiting the acetylcholine esterase, an enzyme specifically responsible for the destruction of neurotransmitter. Chemicals that inhibit

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the acetylcholine esterases act like acetylcholines called as parasympathomimetics and produce characteristic symptoms produced by stimulation of parasympathetic nervous system[3].

Triazophos the pesticide of study is one of the most commonly used Organophosphate pesticide. Triazophos (O,O-diethyl, 0-1phenyl, 1-H,1,2,4, Triazol-3-yl-phosphorothiate is a broad spectrum systemic insecticide and acaricide. It is administered in 2.5 and 5 ppm mixed with feed in groups G2, G3 while in G4 and G5 in addition to this cow urine distillate is also provided to the birds. Due to the persistent nature of triazophos in the environment, it undergoes biomagnifications through food-chain thereby causing serious threat to the human health[4]. The test chemical Triazophos 40% E.C (marketed as *Truzo)* used in this study was procured from local pesticide market in Rudrapur, U.S. Nagar, Uttarakhand, India and the Cow urine distillate was obtained from Cow Research Centre, Nagpur, Maharashtra, India. Birds were continuously observed for different clinical manifestations from the beginning of the trial. All experiments were carried out between 09:00 am and 17:00 h. Institutional Animal Ethics Committee (IAEC) of College of Veterinary and Animal Sciences, Pantnagar, India had approved the experimental protocol. The experiments were performed in accordance with the guidelines on animal experimentation recommended by Committee for Control and Supervision of Experimentation on Animals (CPCSEA), Government of India.

Chicken serve as good animal model for immune toxicological risk assessment, that may be used for the determination of immune responses affected by environmental contaminants including pesticides[5]. Urine therapy is an old system of medicine, which has a very high place in Ayurveda since 5000 years. Cow urine is used in treatment of spleen disorders, indigestion and arthritis, it increases the digestion. It has been observed that the urine of indigenous and hill cows is quite effective as far as the immunomodulation is concerned. Thus, cow urine can be useful in eliminating the harmful effects of pesticides not only in man but in environment as a whole comprising of soil, crop, animal and man etc[6].

2. Materials and Methods

The present study was conducted to investigate Sero biochemical effects of induced Triazophos toxicity in white leghorn cockerels. Different doses of Triazophos were administered via feed at 2.5, 5 ppm level and Cow urine distillate was administered through drinking water at the rate of 1 ml per bird per day to groups G4, G5 along with Tiazophos intoxicated feed respectively for 100 days. No, the concentration of Triazophos was not estimated in Serum.

2.1 Collection of Blood Samples

Blood samples for sero-biochemical examinations were collected from wing vein in sterilized disposable syringes (22 gauge needles) after proper restraining of birds. Blood samples were transferred to non heparin coated tubes for serum separation. Collection of blood samples was done at every 25 days interval starting from day 0 upto 100 days study including day 0.

2.2 Separation of Serum

After collection, blood was allowed to clot in non heparin coated test tubes kept in slanting position (to provide larger surface area) for 3-4 hr at room temperature (18-20°C). After clotting of blood, the serum oozed out of retracted clot and was collected with the help of micropipette in clean micro centrifuge tube which were then centrifuged at 4°C for 20 minutes at 4000 rpm in a refrigerated centrifuge. The top layer of serum was collected in another clean micro centrifuge tube with the help of micropipette and stored at (-20°C) in deep freezer.

2.3 Serobiochemical Parameters

The serum obtain from the collected blood samples was used for the estimation of biochemical parameters viz. glucose[7], total protein[8], albumin[9], globulin, cholesterol, creatinine[10] and uric acid.

2.4 Serum Enzyme Profile

Serum obtained from the collected blood samples was used for the estimation of serum enzymes viz. alanine aminotransferase ALT[11] and aspartate aminotransferase AST[12].

3. Results and Discussion

3.1 Total Protein (gm/dl)

The results of mean total protein values from different groups are presented in Table 1 and Figure 1. A significant

(P<0.01) decrease in the total protein value was observed in all the treated groups as compared to the control after 50th day and continued till the termination of the study on 100th day. However, there was a significant increase (P<0.01) in G4 and G5 as compared to G2 and G3 from 50th day till the end. According to[13] decrease in plasma protein, albumin and globulin could be attributed to renal excretion or impaired protein synthesis or due to liver disorder. Similar findings were recorded by[14] who observed a decrease in total protein levels in the cockerels fed fenvelerate @ 2000 ppm for 20 weeks, as compared to the control. Decrease in the levels of serum protein and albumin concentrations were also reported by[15-18] reported that feeding of cow urine to White leghorn layers significantly increased the Serum total protein.

3.2 Globulin (gm/dl)

The results of mean globulin values from different groups are presented in Table 2 and Figure 2. A significant (P<0.01) decrease in the globulin value was observed in groups G2, G3, G4 and G5 as compared to control from 25th day till 100th day of feeding trial. However, there was a significant (P<0.01) increase in the globulin value in groups G4 and G5 as compared to the G2 and G3 from 25th day of feeding till the end.

3.3 Albumin (gm/dl)

The results of mean albumin values from different groups are presented in Table 3 and Figure 3. There was a significant (P<0.01) decrease in the albumin value from 25th day onwards till the end in G2, G3, G4 and G5 as compared to

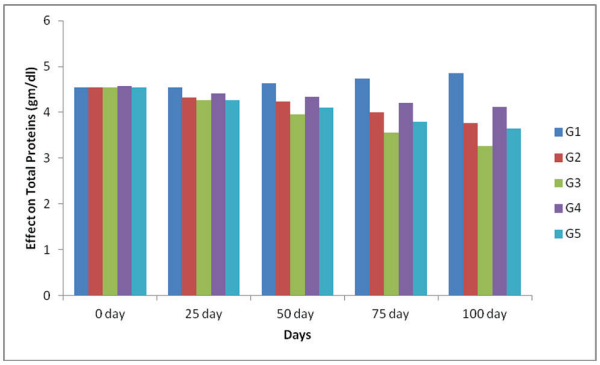


Figure 1. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on total proteins (gm/dl) (n=5).

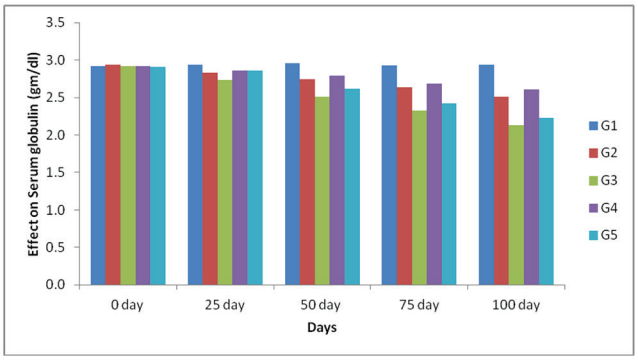


Figure 2. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on Serum globulins (gm/dl) (n=5mean ± S.E). 1 los.

Table 1. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on Total Proteins (gm/dl), (mean ± S.E). 1 los

Group / Day	G1 (0 ppm)	G2 (2.5ppm)	G3 (5 ppm)	G4(2.5 ppm) & Cow urine	G5(5 ppm) & Cow urine
O day	4.54 ± 0.004	4.54 ± 0.051	4.54 ± 0.005	4.568 ± 0.0086	4.55 ± 0.011
25 day	4.55 ± 0.004	4.32 ± 0.037^{a}	4.26 ± 0.011^{a}	4.41 ± 0.0141^{a}	4.258 ± 0.014^{a}
50 day	4.62 ± 0.003^{ab}	4.23 ± 0.014^{ab,w}	3.96 ± 0.013^{ab,wx}	4.33 ± 0.004^{ab,wxy}	4.108 ± 0.005 ^{ab,wxyz}
75 day	4.73 ± 0.003^{abc}	4 ± 0.089^{ab,w}	3.56 ± 0.013^{abc,wx}	4.20 ± 0.016 ^{abc,wxy}	3.80 ± 0.071 ^{abc,wxyz}
100 day	4.86 ± 0.004^{abcd}	3.76 ± 0.04^{abcd,w}	3.26 ± 0.011^{abcd,wx}	4.11 ± 0.009^{abcd,wxy}	3.64 ± 0.025 ^{abcd,wxyz}
Mean	4.662	4.1716	3.919	4.32	4.071

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w = value differs significantly with G1 group.
x = value differs significantly with G2 group.
y = value differs significantly with G3 group.
z = value differs significantly with G4 group

Table 2. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on Serum globulins (gm/dl) (n=5mean ± S.E). 1 los

Group / Day	G1 (0 ppm)	G2 (2.5ppm)	G3(5 ppm)	G4(2.5 ppm) & Cow urine	G5(5 ppm) & Cow urine
O day	2.91 ± 0.008	2.93 ± 0.012	2.91 ± 0.008	2.92 ± 0.004	2.91 ± 0.004
25 day	2.93 ± 0.005^{a}	2.82 ± 0.004^{a,w}	2.73 ± 0.007^{a,wx}	2.864 ± 0.0024^{wxy}	2.86 ± 0.009^{wxy}
50 day	2.95 ± 0.007^{ab}	2.74 ± 0.001^{ab,w}	2.51 ± 0.009^{ab,wx}	2.792 ± 0.011^{ab,wxy}	2.61 ± 0.004^{ab,wxyz}
75 day	2.92 ± 0.006^{c}	2.64 ± 0.003^{abc,w}	2.32 ± 0.013^{abc,wx}	2.684 ± 0.005^{ab,wxy}	2.42 ± 0.009^{abc,wxyz}
100 day	2.93 ± 0.002^{ac}	2.51 ± 0.009^{abcd,w}	2.13 ± 0.009^{abcd,wx}	2.61 ± 0.006^{abc,wxy}	2.23 ± 0.007^{abcd,wxyz}
Mean	2.933	2.73	2.522	2.774	2.608
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Table 3. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on Serum albumins (gm/dl) (n=5, mean ± S.E). 1 los

Group / Day	G1 (0 ppm)	G2 (2.5ppm)	G3 (5 ppm)	G4 (2.5 ppm) & Cow urine	G5(5 ppm) & Cow urine
O day	1.63 ± 0.005	1.63 ± 0.004	1.65 ± 0.008	1.65 ± 0.0004	1.64 ± 0.004
25 day	1.64 ± 0.007	1.50 ± 0.009 ^{a,w}	1.53 ± 0.007 ^{a,wx}	1.55 ± 0.0037 ^{a,wxy}	1.41 ± 0.007 ^{a,wxyz}
50 day	1.67 ± 0.009^{a}	1.49 ± 0.006 ^{a,w}	1.45 ± 0.018 ^{ab,wx}	1.53 ± 0.005 ^{ab,wxy}	1.48 ± 0.011 ^{ab,wyz}
75 day	1.81 ± 0.007 ^{abc}	1.36 ± 0.009 ^{abc,w}	1.23 ± 0.007 ^{abc,wx}	1.52 ± 0.005^{a,wxy}	1.386 ± 0.012^{abc,wxyz}
100 day	1.93 ± 0.009 ^{abcd}	1.29 ± 0.008 ^{abc,w}	1.21 ± 0.007^{abc,wx}	1.51 ± 0.003^{a,wxy}	1.48 ± 0.011^{ac,wxyz}
Mean	1.739	1.458	1.418	1.557	1.48
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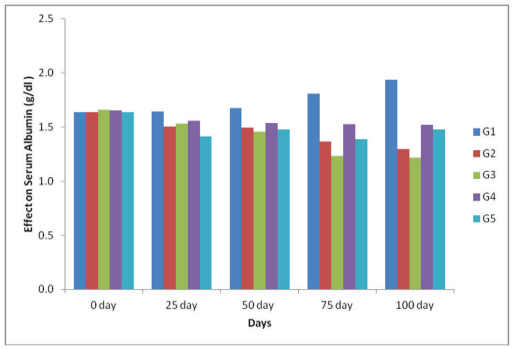


Figure 3. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on Serum albumins (gm/dl) (n=5).

control group which continued till the end of the feeding trial. However, there was a significant (P<0.01) increase in G4 and G5 as compared to G3 and G2 from 25th day onwards till the end.

The decrease in total serum proteins and albumin might be attributed to hepatotoxicity, hepatorenal dysfunction and gastroenteritis. Decrease in the total protein value may be due to lesser release of protein from the liver into the general body circulation.

The significant (P<0.01) increase in total protein, albumin and globulin value in Cow urine supplemented groups as compared to pesticide treated groups may be due to its anabolic effects as suggested by increased body weight, lowered ALT and AST in cow urine treated

groups. Thereby producing enhanced liver function and hence increased amount of total protein, albumin and globulin.

3.4 Uric Acid (mg/dl)

The results of mean uric acid values from different groups are presented in Table 4 and Figure 4. There was a significant (P<0.01) increase in uric acid in all the treated groups i.e. G2, G3, G4 and G5 as compared to control from 25th day onwards till the end of the study.

3.5 Creatinine (mg/dl)

The results of mean creatinine values from different groups are presented in Table 5 and Figure 5 Significant (P<0.01) increase in creatinine values was observed after 25th, 50th, 75th and 100th days in groups G2, G3, G4 and G5 respectively as compared to the control.

Similar findings were reported by[19] in which the BUN and creatinine showed significant increase in deltamethrin treated groups as compared to the values in control group.

Increase in serum uric acid and serum creatinine level might have been due to nephrotoxicity. Also free radical induced oxidative damage by Triazophos on the kidney would be the reason for elevated Uric acid, Creatinine.

3.6 Glucose (mg/dl)

The results of mean glucose values from different groups are presented in Table 6 and Figure 6. A significant (P<0.01)

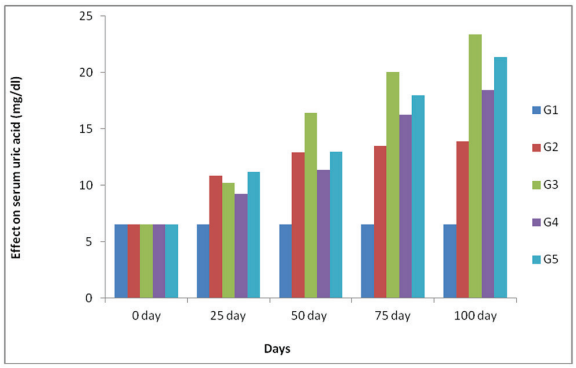


Figure 4. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on Serum Uric acid (mg/dl) (n=5).

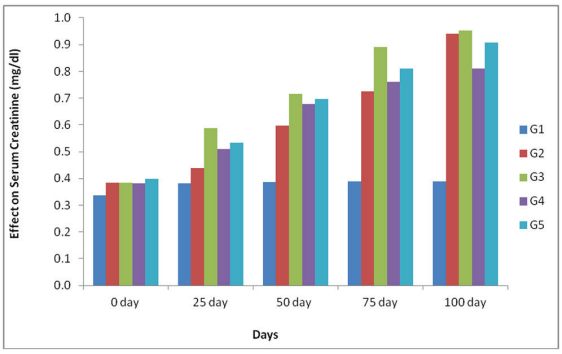


Figure 5. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on Serum Creatinine (mg/dl) (n=5).

Table 4. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on Serum Uric acid (mg/dl) (n=5, mean ± S.E). 1 los

Group / Day	G1 (0 ppm)	G2(2.5ppm)	G3 5 ppm	G4 (2.5 ppm)& cow urine	G5(5 ppm) & Cow urine
O day	6.52 ± 0.054	6.52 ± 0.014	6.52 ± 0.006	6.52 ± 0.006	6.53 ± 0.004
25 day	6.52 ± 0.005	$10.84 \pm 0.015^{a,w}$	$10.2 \pm 0.009^{a,wx}$	$9.21 \pm 0.009^{a,wxy}$	$11.2 \pm 0.011^{a,wxyz}$
50 day	6.525 ± 0.0007	$12.92 \pm 0.011^{ab,w}$	$16.4 \pm 0.013^{ab,wx}$	$11.37 \pm 0.009^{ab,wxy}$	$12.95 \pm 0.009^{ab,wyz}$
75 day	6.527 ± 0.001	$13.47 \pm 0.013^{abc,w}$	$20.05 \pm 0.013^{abc,wx}$	$16.24 \pm 0.011^{abc,wxy}$	$17.98 \pm 0.036^{abc,wxyz}$
100 day	6.532 ± 0.0005	$13.88 \pm 0.013^{abcd,w}$	$23.38 \pm 0.008^{abcd,wx}$	$18.45 \pm 0.011^{abcd,wxy}$	$21.34 \pm 0.007^{abcd,wxyz}$
Mean	6.5256	11.52	15.312	12.364	14.004
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Table 5. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on Serum Creatinine (mg/dl) (n=5, mean ± S.E). 1 los

Group / Day	G1 (0 ppm)	G2 (2.5ppm)	G3 (5 ppm)	G4 (2.5 ppm) & Cow urine	G5 (5 ppm) & Cow urine
O day	0.38 ± 0.011	0.384 ± 0.005	0.38 ± 0.0068	0.38 ± 0.0086	0.398 ± 0.0074
25 day	0.381 ± 0.002	0.438 ± 0.006 ^{a,w}	0.58 ± 0.012^{a,wx}	0.50 ± 0.0114 ^{a,wxy}	0.534 ± 0.009^{a,wxyz}
50 day	0.386 ± 0.0006	0.590 ± 0.007^{ab,w}	0.71 ± 0.009^{ab,wx}	0.67 ± 0.004^{ab,wxy}	0.69 ± 0.0081^{ab,wxyz}
75 day	0.389 ± 0.0009	0.72 ± 0.0025^{abc,w}	0.89 ± 0.012^{abc,wx}	0.76 ± 0.007^{ab,wxy}	0.81 ± 0.006^{abc,wxyz}
100 day	0.388 ± 0.0012	0.94 ± 0.0055^{abcd,w}	0.95 ± 0.008^{abcd,w}	0.81 ± 0.006^{abcd,wxy}	0.90 ± 0.009^{abcd,wxyz}
Mean	0.3851	0.615	0.706	0.628	0.669

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x = value differs significantly with G2 group.
y = value differs significantly with G3 group.
z = value differs significantly with G4 group

Table 6. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on Serum Glucose (mg/dl) (n=5, mean ± S.E). 1 los

Group / Day	G1 (0 ppm)	G2 (2.5ppm)	G3 (5 ppm)	G4 (2.5 ppm) & Cow urine	G5(5 ppm) & Cow urine
O day	213 ± 0.55	213 ± 0.45	213.2 ± 0.38	213.4 ± 0.51	213.6 ± 0.245
25 day	214 ± 0.63^{a}	215.2 ± 0.58 ^{a,w}	215.4 ± 0.93 ^{a,w}	216.2 ± 0.584 ^{a,wx}	216 ± 0.709 ^{a,w}
50 day	212.8 ± 1.07^{b}	216 ± 0.45^{a,w}	216.2 ± 0.58 ^{a,w}	218.4 ± 0.51^{ab,wxy}	218.4 ± 0.511^{ab,wxy}
75 day	209.6 ± 0.75^{abc}	215.6 ± 0.51^{a,w}	217.4 ± 0.87 ^{abc,wx}	219.4 ± 0.511^{abc,wxy}	219.6 ± 1.367^{abc,wxy}
100 day	208.8 ± 0.74^{abc}	216.2 ± 0.375^{ab,w}	219.2 ± 0.59 ^{abcd,wx}	220 ± 0.55 ^{abc,wx}	222.8 ± 0.584^{abcd,wxyz}
Mean	211.64	215.56	216.52	217.68	218.24

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z = value differs significantly with G4 group

increase was observed in groups G2, G3, G4 and G5 as compared to the G1 from the 25th day of the experiment which continued till the end of the experiment.

3.7 Cholesterol (mg/dl)

The results of mean cholesterol values from different groups are presented in Table 7 and Figure 7. There was significant (P<0.01) increase in the cholesterol level in groups G2, G3, G4 and G5 as compared to G1 from 25th day of Triazophos feeding which continued till the end of the experiment.

Increase in glucose levels has also been reported by[23, 19, 20, 22]. Increased Glucose and Cholesterol concentrations were also reported by[16] reported that supplementation of cow urine to White leghorn layers significantly increased the serum total cholesterol and serum Glucose.

The increased glucose concentration in the present experiment can be attributed to the effects of Triazophos

Table 7. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on Serum Cholesterol (mg/dl) (n=5, mean ± S.E). 1 los

Group / Day	G1 (0 ppm)	G2 (2.5ppm)	G3 (5 ppm)	G4 (2.5 ppm) & Cow urine	G5(5 ppm) & Cow urine
0 day	158.2 ± 0.86	158 ± 0.45	158.4 ± 0.015	158 ± 0.019	158 ± 0.016
25 day	158.60 ± 68	159.6 ± 0.511^{w}	162.8 ± 0.025 ^{a,wx}	166 ± 0.025^{a,wxy}	165.6 ± 0.019 ^{a,wxy}
50 day	158.3 ± 0.51	171 ± 0.55^{ab,w}	176. ± 0.020 ^{ab,wx}	175.8 ± 0.0083^{ab,wx}	180.8 ± 0.0181^{ab,wxyz}
75 day	158.8 ± 0.67	176.2 ± 0.67^{abc,w}	183.8 ± 0.027^{abc,wx}	181.4 ± 0.0158 ^{abc,wxy}	189.2 ± 0.0122^{abc,wxzy}
100 day	159.8 ± 0.59^{abcd}	182.8 ± 0.59^{abcd,w}	189.0 ± 0.017^{abcd,wx}	185.8 ± 0.0122^{abcd,wxy}	193.4 ± 0.0216^{abcd,wyxz}
Mean	158.875	169.68	174	173.72	178.04

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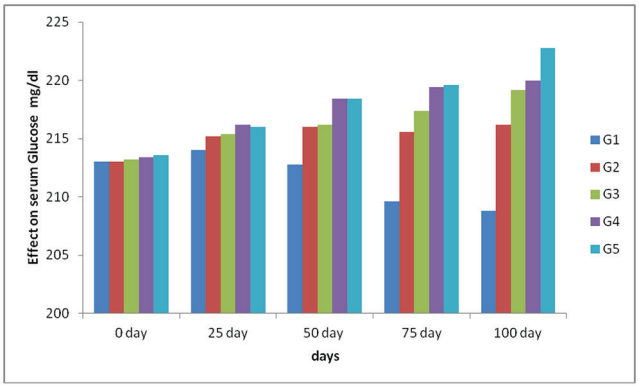


Figure 6. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on Serum Glucose (mg/dl) (n=5).

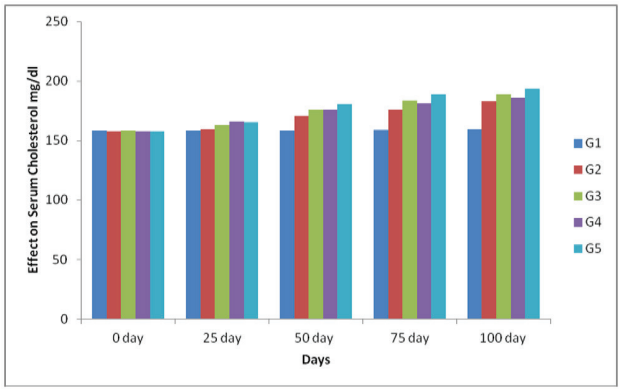


Figure 7. Effect of 100 days feeding Triazophos at 2.5ppm, 5ppm, Cow Urine + Triazophos at 2.5 ppm & 5 ppm in normal ration of WLH Cockerels on Serum Cholesterol (mg/dl) (n=5).

on hepatic enzyme systems which are intimately involved in glucose metabolism Hepatic cholesterol homeostasis is maintained by equilibrium between the activities of the hydroxyl methyl glutryl Coenzyme A reductase and acyl co enzyme A cholesterol acyl transferase. Thus an elevation in cholesterol might have been due to impaired lipid metabolism and generation of more and more of HDL and LDL component[16, 17, 19-23].

3.8 Serum Enzyme

3.8.1 AST (IU/l)

The results of mean AST values from different groups are presented in Table 8 and Figure 8. There was a significant (P<0.01) increase in AST values in groups G2, G3, G4 and G5 as compared to control on 25th and 50th day till the end of the trial. A significant (P<0.01) decrease was observed in groups G4 and G5 as compared to the G2 and G3 from 50th day till 100th day of the feeding trial.

3.8.2 ALT (IU/l)

The results of mean ALT values from different groups are presented in Table 9 and Figure 9. From 25th day there was a significant (P<0.01) increase in ALT value in groups G2, G3, G4 and G5 as compared to the control which continued till the end of the study. A significant decrease (P<0.01) was observed in G4 and G5 groups from 50th day till 100th day of the feeding trial as compared to the G2 and G3.

The rise in activity of serum AST and ALT enzymes in pesticide treated groups has been attributed due to the damaged structural and cellular integrity of the hepatocytes. Being cytoplasmic in location, these enzymes are released into systemic blood circulation after cellular damage of hepatocytes[25]. Lipid peroxidation could be the mechanism of organophosphate compound induced cell injury which might be responsible for toxicological effects. These findings were further supported by histopathological studies. The picture of the slide supports the same picture. The reduction in increase of serum AST and ALT enzymes in Cow urine supplemented groups as compared to pesticide treated groups may be due to its anabolic effects. Thereby producing enhanced liver function and proving its hepatoprotective nature.

4. Conclusion

There was significant (P<0.01) decrease in total protein, albumin and globulin in all the treated groups as compared to the control from 25th day onwards which continued till the termination of the study on 100th day. However, there was a significant (P<0.01) increase in G4 and G5 as compared to G3, G2 from 25th day onwards and continued upto the 100th day of the study. A significant (P<0.05) increase in Uric acid, Glucose, total cholesterol and creatinine level was observed in all the treated groups i.e. G2, G3, G4 and G5 as compared to control from 25th day onwards till the end of the study. There was significant (P<0.01) increase in levels of AST and ALT from 25th day onwards as compared to control till the end of study. However, a significant (P<0.01) decrease was observed in G4 and G5 groups on 50th, 75th and 100th day of feeding interval as compared to the groups G2 and G3.

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