RESULTS

Blood chemistry:

Liver function enzyme:

As shown in **table (1)** and illustrated in **fig. (1)** there were significant difference at ($p<0.05$) the AST (U/L) mean values of ciprofloxacin treated chicken and non treated chicken were 93.33±2.31 and 76.47±3.38.

Regarding the results in **table (2)** and **fig. (1)** the mean values of ALT (U/L) of ciprofloxacin treated chicken and non treated one were 12.47± 0.41 and 10.57± 0.71 with significant difference at ($P<0.05$) .

It was obvious that the mean value of alkaline phosphates (U/L) of the ciprofloxacin treated group and control one were 252.27±4.16 and 202.53±6.83. It was noticed that minimal value of alkaline phosphatase of the control group was significantly lower than of the ciprofloxacine treated group **table (3)** at significant difference at ($P<0.05$).

Table (1) Determination of AST (U/L) in serum of broiler after oral administration of 10mg/kg ciprofloxacin for five successive days.

parameter / Sample	Minimum	Maximum	Mean±SE
Ciprofloxacin treated group	77.00	105.00	93.33±2.31
Non-ciprofloxacin treated group (control)	58.00	97.00	76.47±3.38

Presence of significant difference at P< 0.05

Table (2) Determination of ALT (U/L) in serum of broiler after oral administration of 10mg/kg ciprofloxacin for five successive days.

parameter / Sample	Minimum	Maximum	Mean±SE
Ciprofloxacin treated group	10.00	15.00	12.47±0.41
Non-ciprofloxacin treated group (control)	6.00	15.00	10.57±0.71

Significant difference at P< 0.05

Table (3) Determination of Alkaline phosphatase (U/L) in serum of broiler after oral administration of 10mg/kg ciprofloxacin for five successive days.

parameter / Sample	Minimum	Maximum	Mean±SE
Ciprofloxacin treated group	228.00	278.00	252.27±4.16
Non-ciprofloxacin treated group (control)	170.00	263.00	202.53±6.83

Significant difference at P< 0.05

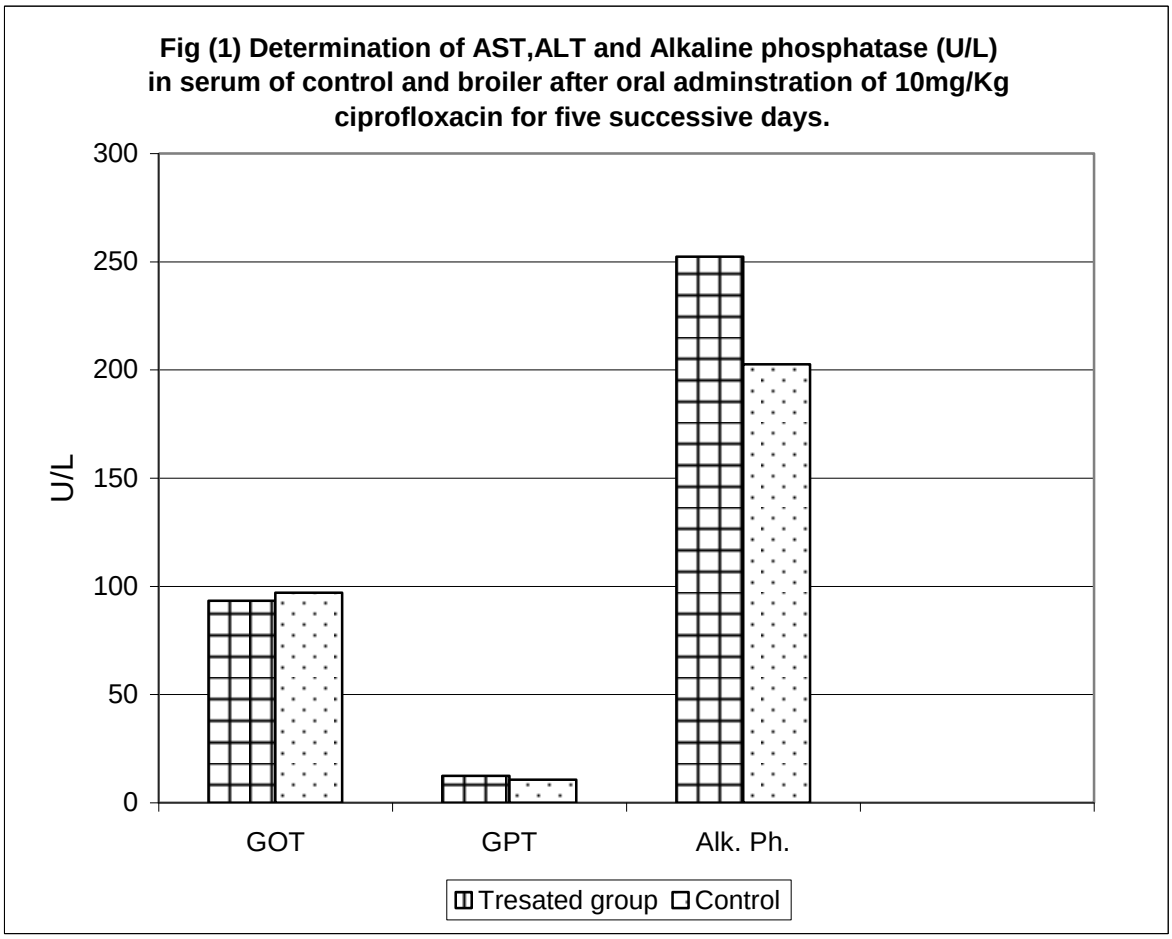


Table (4) and **fig. (2)** illustrated the mean value of albumin (mg/dL) of ciprofloxacin treated chicken and control group were 2.1 ± 0.047 and 2.34±0.058 respectively. It was noticed that the minimum and maximum values of Albumin for the same formation group were (1.90 and 2.00) and (2.4 and 2.7) respectively.

From **table (5)** and **fig. (3)** It was proved that the cholesterol of treated group was relatively higher than control one. Significant difference at ($p<0.05$).

The triglycerides (mg/dl) mean values of ciprofloxacin treated group illustrated in **table (6)** and **fig. (3)** And as in case of cholesterol the ciprofloxacin treated chicken had relatively higher results than non-treated group. There were significant difference at ($p<0.05$).

Table (7) it was reported that the mean values of urea (mg/dL) of ciprofloxacin treated chicken and control one were 10.16±0.22 and 11.33±0.4 with noticeable decrease in urea. There were significant difference at ($p<0.05$) **fig. (4)**.

Table (8) and **fig. (4)** Illustrated the mean value of creatinine (mg/dL) were 0.55±0.01 and 0.77±0.03 as the same in urea decrease in creatinine in treated group.

Table (4) Determination of Albumin (mg/dL) in serum of broiler after oral administration of 10mg/kg ciprofloxacin for five successive days.

parameter / Sample	Minimum	Maximum	Mean±SE
Ciprofloxacin treated group	1.90	2.40	2.10±0.047
Non-ciprofloxacin treated group (control)	2.00	2.70	2.34±0.058

Significant difference at P< 0.05

Fig (2) Determination of albumin (mg/dL) in serum of control and broiler after oral adminstration of 10mg/Kg ciprofloxacin for five successive days.

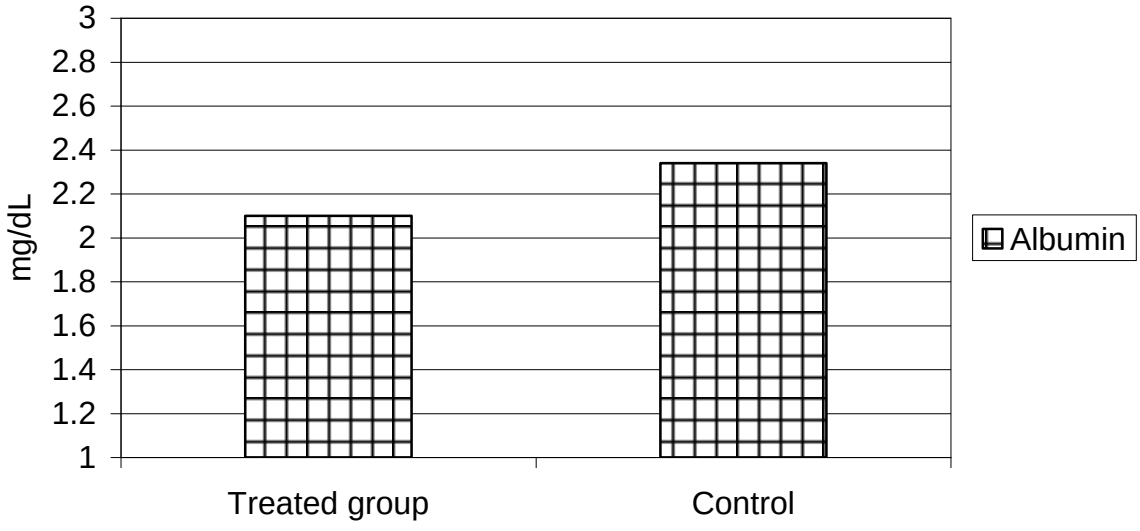


Table (5) Determination of Cholesterol (mg/dL) in serum of broiler after oral administration of 10mg/kg ciprofloxacin for five successive days.

parameter / Sample	Minimum	Maximum	Mean±SE
Ciprofloxacin treated group	128.30	151.60	138.50±1.77
Non-ciprofloxacin treated group (control)	107.00	140.30	121.30±3.01

Significant difference at P< 0.05

Table (6) Determination of Triglycerides (mg/dL) in serum of broiler after oral administration of 10mg/kg ciprofloxacin for five successive days.

parameter / Sample	Minimum	Maximum	Mean±SE
Ciprofloxacin treated group	88.50	101.20	94.51±1.01
Non-ciprofloxacin treated group (control)	57.30	89.70	74.30±2.95

Significant difference at P< 0.05

Fig. (3)Determination cholesterol and Triglyceride (mg/dL) in serum of control and broiler after oral adminstration of 10mg/Kg ciprofloxacin for five successive days.

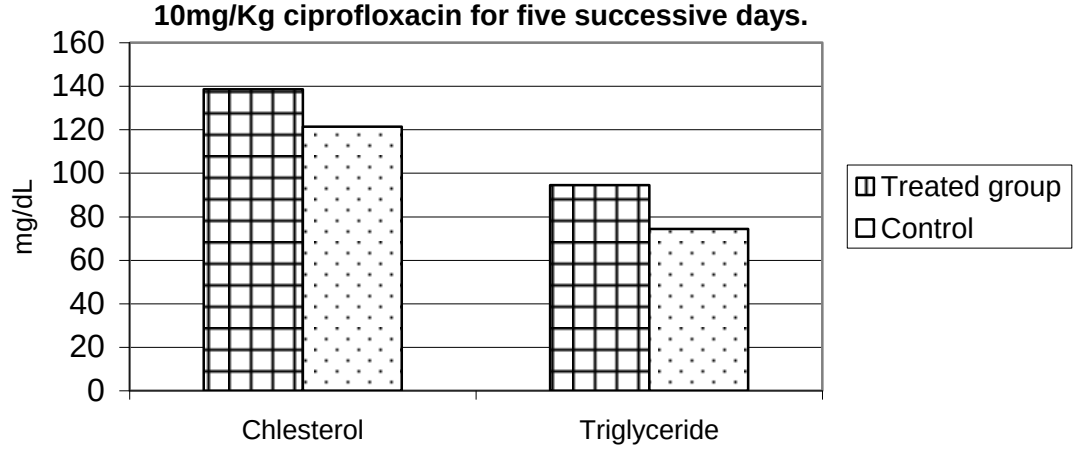


Table (7) Determination of Urea (mg/dL) in serum of broiler after oral administration of 10mg/kg ciprofloxacin for five successive days.

parameter / Sample	Minimum	Maximum	Mean±SE
Ciprofloxacin treated group	8.60	11.50	10.16±0.22
Non-ciprofloxacin treated group (control)	8.50	13.50	11.33±0.40

Significant difference at P< 0.05

Table (8) Determination of Creatinine (mg/dL) in serum of broiler after oral administration of 10mg/kg ciprofloxacin for five successive days.

parameter / Sample	Minimum	Maximum	Mean±SE
Ciprofloxacin treated group	0.48	0.63	0.55±0.01
Non-ciprofloxacin treated group (control)	0.63	0.92	0.77±0.03

Significant difference at P< 0.05

It was reported that the mean values of uric acid (mg/dL) of both ciprofloxacin treated group and control one 3.69±0.09 and 3.68±0.13 as in **table (9)** and **fig. (4)**. It was obvious that the uric acid level was not affected. Non significant difference at ($p<0.05$).

In **table (10)** and **fig (5)** the mean values of sodium (mEq/L) chicken treated with ciprofloxacin were 142.6±0.52 and 138.87±1.42. There were significant difference at ($p<0.05$).

The mean values of potassium (mEq/L) of both ciprofloxacin treated and non treated one were 6.5±0.11 and 6.05±0.10. **Table (11)** and **fig. (5)** cleared that the electrolytes (Na and K) in both first treated group and second control one were nearly similar to each other.

It was recorded in **table (12)** that the calcium mean level (mg/dL) in ciprofloxacin treated chicken and control one were 9.41±0.21 and 8.81±0.10.

Table (13) illustrated the mean values of phosphorous (mg/dL) of ciprofloxacin treated chicken and non treated chicken were 4.81±0.09 and 4.33±0.07 with significant difference at ($p<0.05$).

From **fig. (6)** it was noticed that the treated with ciprofloxacin was elevated the calcium and phosphorous of chicken.

Table (9) Determination of Uric acid (mg/dL) in serum of broiler after oral administration of 10mg/kg ciprofloxacin for five successive days.

parameter / Sample	Minimum	Maximum	Mean±SE
Ciprofloxacin treated group	3.10	4.10	3.69±0.09 #
Non-ciprofloxacin treated group (control)	2.80	4.30	3.68±0.13 #

Non-Significant difference at P> 0.05

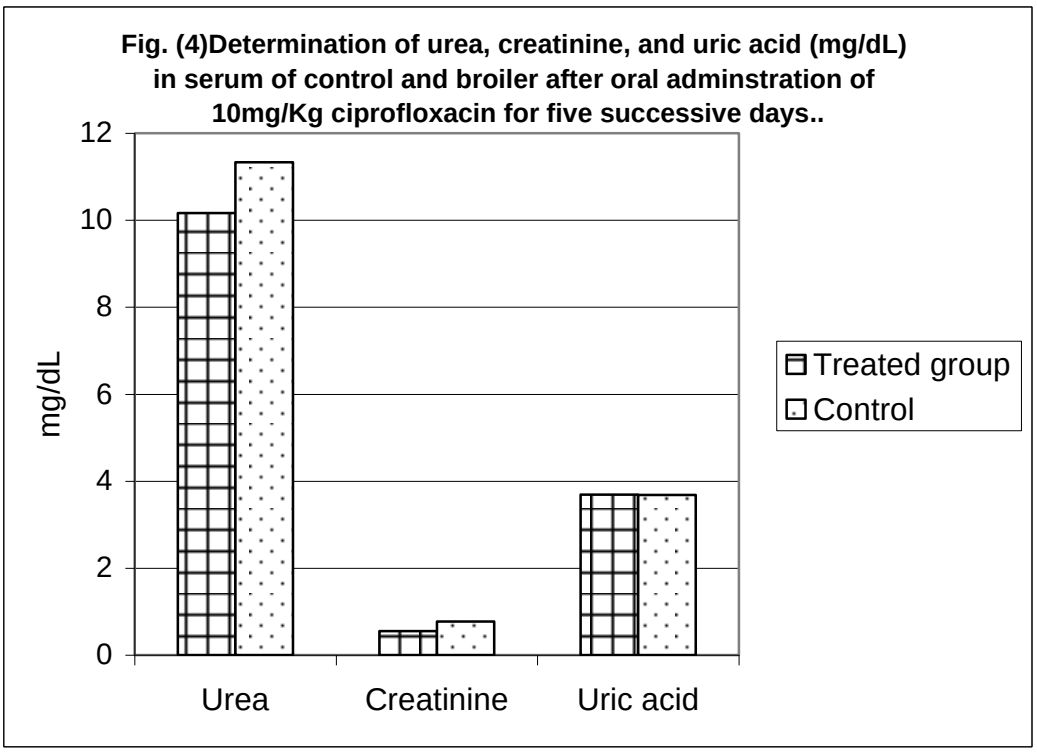


Table (10) Determination of Sodium (mEq/L) in serum of broiler after oral administration of 10mg/kg ciprofloxacin for five successive days.

parameter / Sample	Minimum	Maximum	Mean±SE
Ciprofloxacin treated group	140.00	146.00	142.60±0.52
Non-ciprofloxacin treated group (control)	130.00	150.00	138.87±1.42

Significant difference at P< 0.05

Table (11) Determination of Potassium (mEq/L) in serum of broiler after oral administration of 10mg/kg ciprofloxacin for five successive days.

parameter / Sample	Minimum	Maximum	Mean±SE
Ciprofloxacin treated group	5.80	7.00	6.50±0.11
Non-ciprofloxacin treated group (control)	5.50	6.80	6.05±0.10

Significant difference at P< 0.05

Fig. (5) Determination of Sodium and Potassium (mEq/L) in serum of control and broiler after oral adminstration of 10mg/Kg ciprofloxacin for five successive days.

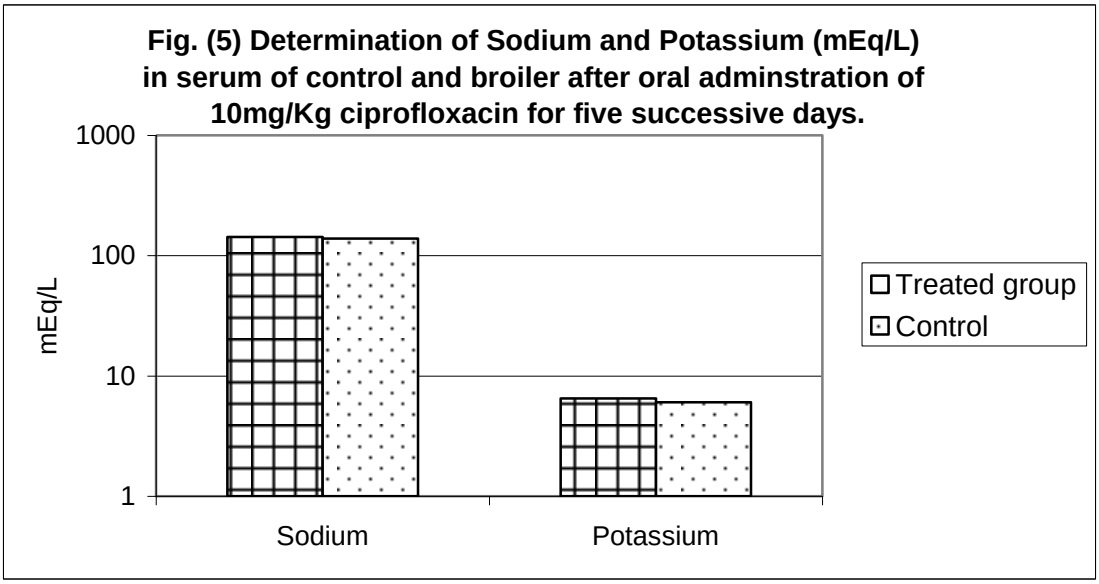


Table (12) Determination of Calcium (mg/dL) in serum of broiler after oral administration of 10mg/kg ciprofloxacin for five successive days.

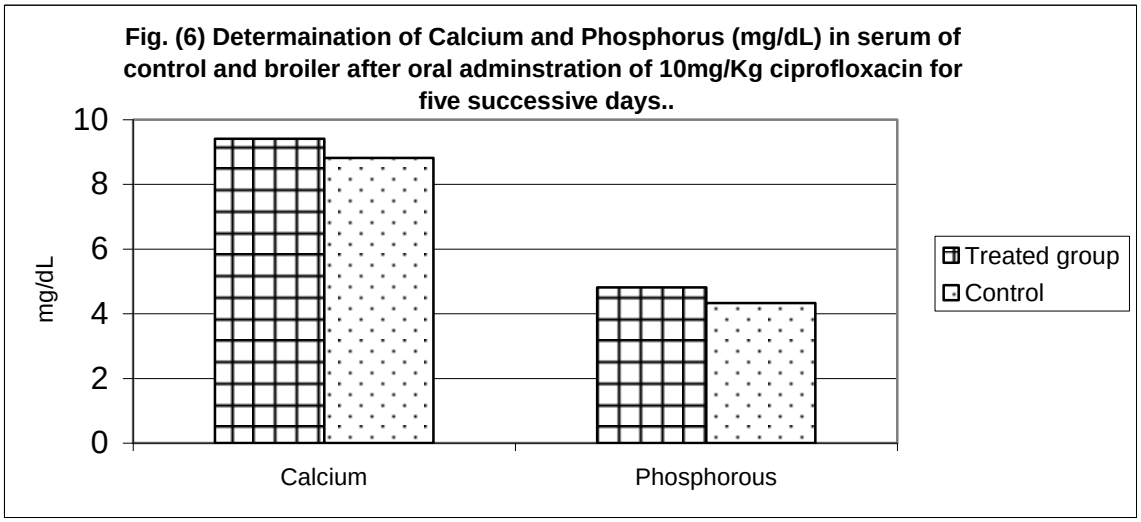
parameter / Sample	Minimum	Maximum	Mean±SE
Ciprofloxacin treated group	8.80	10.20	9.41±0.21
Non-ciprofloxacin treated group (control)	8.20	9.80	8.81±0.10

Significant difference at P< 0.05

Table (13) Determination of Phosphorous (mg/dL) in serum of broiler after oral administration of 10mg/kg ciprofloxacin for five successive days.

parameter / Sample	Minimum	Maximum	Mean±SE
Ciprofloxacin treated group	4.30	5.30	4.81±0.09
Non-ciprofloxacin treated group (control)	3.80	4.70	4.33±0.07

Significant difference at P< 0.05



The immunological studies (IgG and IgM) in serum of broiler after oral administration of 10 mg/kg body weight ciprofloxacin for five successive days were illustrated in **table (14)** and **fig (7).** The mean values for test and control were (126.12±0.06 and 123.04±0.08) and (11.41±0.07 and 9.73±0.05) respectively. There is significant difference between the test and control samples in case of IgG as well as IgM at ($p<0.05$).

The macrophage activity percent and index for both test and control chicken mean values were (63.13±0.9 and 65.07±0.9) and (0.35±0.01 and 0.37±0.03) respectively **table (15).**

There is no significant difference between the test and control samples in both phagocytic index and percent **fig. (8).**

Table (14) Immunological studies (IgG and IgM) in serum of broiler after oral administration of 10mg/kg b. wt. ciprofloxacin for five successive days.

Sample / Parameter	IgG		IgM	
	Test	Control	Test	Control
Min	125.8	122.5	11.1	9.4
Max	126.5	123.7	11.9	10
Mean±SE	126.12±0.06	123.04±0.08	11.41±0.07	9.73±0.05

Significant difference at P< 0.05
Significant difference at P< 0.05

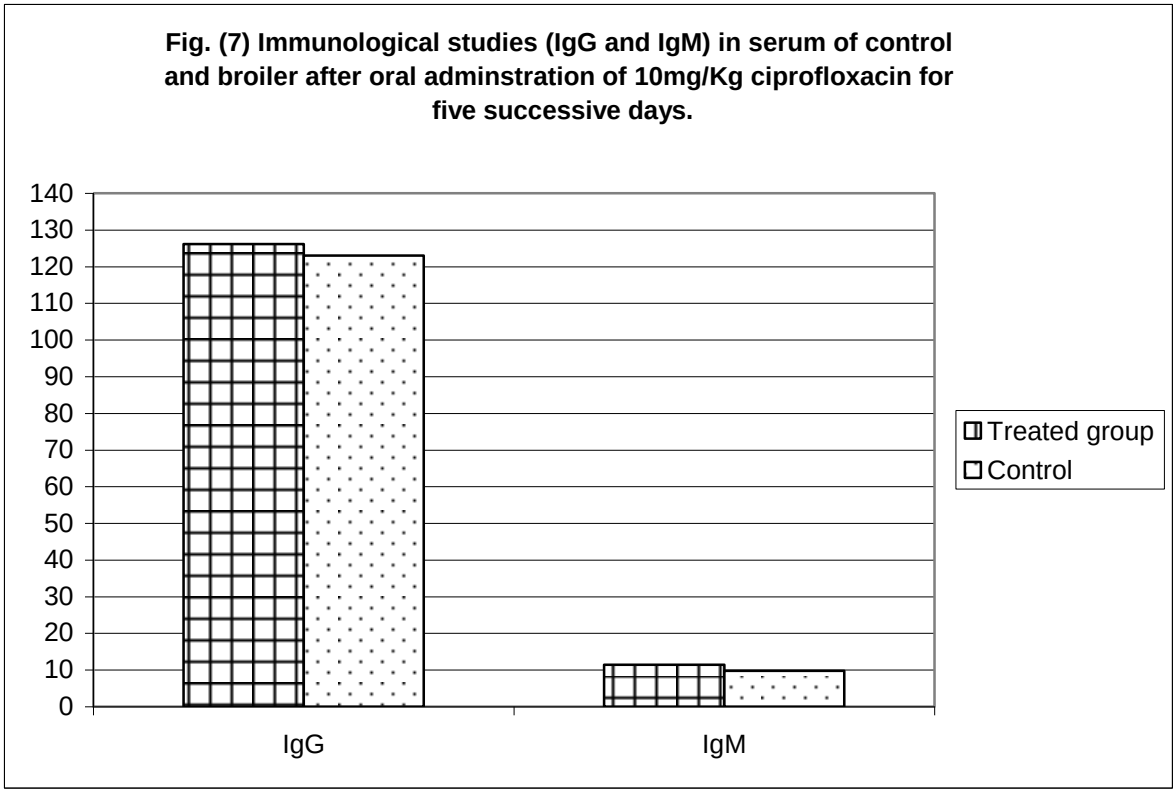


Table (15) Macrophage activity (Phagocytic % and Phagocytic Index) in serum of broiler after oral administration of 10mg/kg b. wt. ciprofloxacin for five successive days.

Sample / Parameter	Phagocytic %		Phagocytic Index	
	Control	Treated	Control	Treated
Min	56	60	0.29	0.046
Max	68	70	0.45	0.45
Mean±SE	63.13±0.9 #	65.07±0.9 #	0.35±0.01 ##	0.37±0.03 ##

#= Nonsignificant difference at P>0.05
##=Nonsignificant difference at P> 0.05

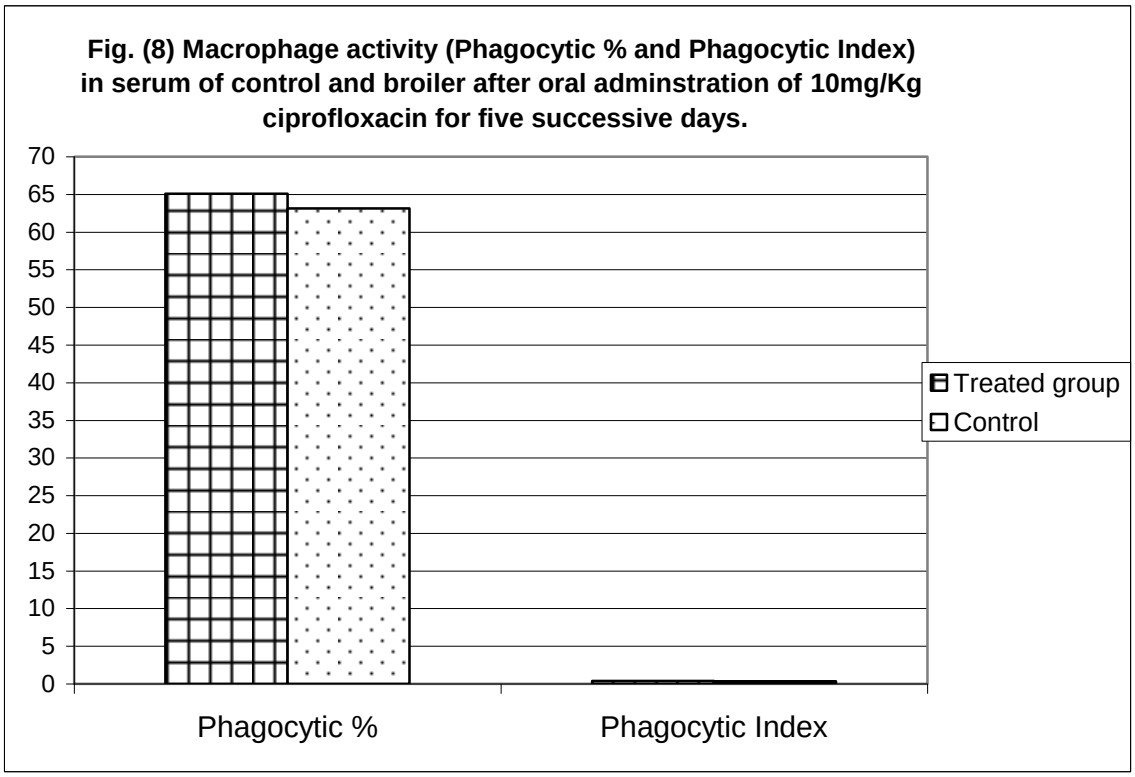


Fig. (8) Macrophage activity (Phagocytic % and Phagocytic Index) in serum of control and broiler after oral adminstration of 10mg/Kg ciprofloxacin for five successive days.

Haematological criteria (PCV%, RBCs, Hb, MCV, MCH and MCHC) in serum of broiler after oral administration of 10mg/kg b. wt. ciprofloxacin for five successive days. **Table (16)** there were significant difference at ($p<0.05$) and non significant difference at ($p>0.05$) (MCH).

In **table (17)** Haematological criteria (PCV%, RBCs, Hb, MCV, MCH and MCHC) in serum of control broiler, there were significant difference at ($p<0.05$) and non significant difference at ($p>0.05$) (MCH). **Fig (9).**

Leucocytes ($\times 10^3$ UL) count in blood of broiler after oral administration of 10mg/kg b. wt. ciprofloxacin for five successive days. **Table (18)** there were non significant difference at ($p>0.05$) **(fig. (10).**

Table (19) Monocytes, Esinophils and basophils percentage of blood of broiler after oral administration of 10mg/kg b. wt. ciprofloxacin for five successive days. There were significant difference at ($p<0.05$) (Esinophil) and non significant difference at ($p>0.05$) **fig (11).**

Table (16) Haematological criteria (PCV%, RBCs, Hb, MCV, MCH and MCHC) in serum of broiler after oral administration of 10mg/kg b. wt. ciprofloxacin for five successive days.

Sample / Parameter	PCV	RBC'S	Hb	MCV	MCH	MCHC
Min	35	1.95	6.40	144.00	28.57	16.41
Max	43	3.10	8.20	200.00	34.52	24.88
Mean±SE	3.8.0±0.69	2.40±0.09	7.47±0.30	163.60±5.30	31.60±0.44 #	19.65±0.60

Significant difference at P< 0.05
#= Nonsignificant difference at P> 0.05

Table (17) Haematological criteria (PCV%, RBCs, Hb, MCV, MCH and MCHC) in serum of control broiler

Sample / Parameter	PCV	RBC'S	Hb	MCV	MCH	MCHC
Min	25	2.3	7.5	88	28.39	26.13
Max	35	3.31	10.2	113	34.57	39.8
Mean±SE	29.6±1.05	2.99±0.08	9.45±0.32	98±3	31.4±0.6 #	32.4±1.1

Significant difference at P< 0.05
#= Nonsignificant difference at P> 0.05

Fig. (9) Haematological criteria (PCV%, RBCs, Hb, MCV, MCH and MCHC) in serum of control and broiler after oral adminstration of 10mg/Kg ciprofloxacin for five successive days.

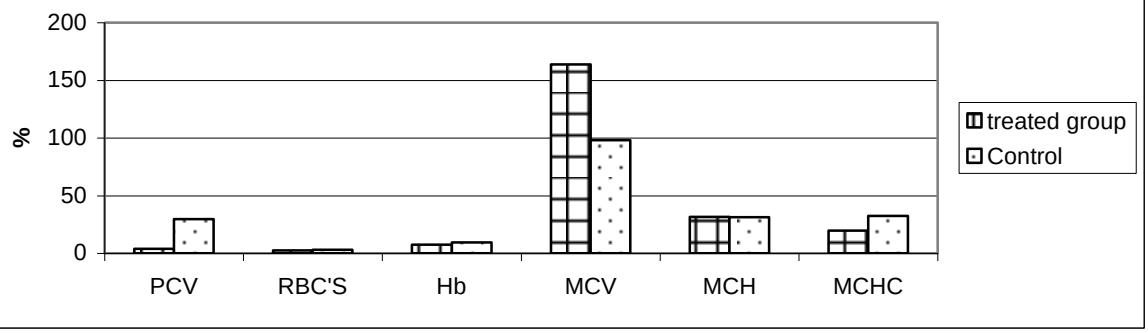


Table (18) Leucocytes ($\times 10^3$ UL) count in blood of broiler after oral administration of 10mg/kg b. wt. ciprofloxacin for five successive days.

Samples / Parameter	Test	Control
Min	13.5	11.8
Max	18.2	16.2
Mean	15.69 #	13.28 #
±SE	0.3	0.32

#= Non significant difference at P>0.05

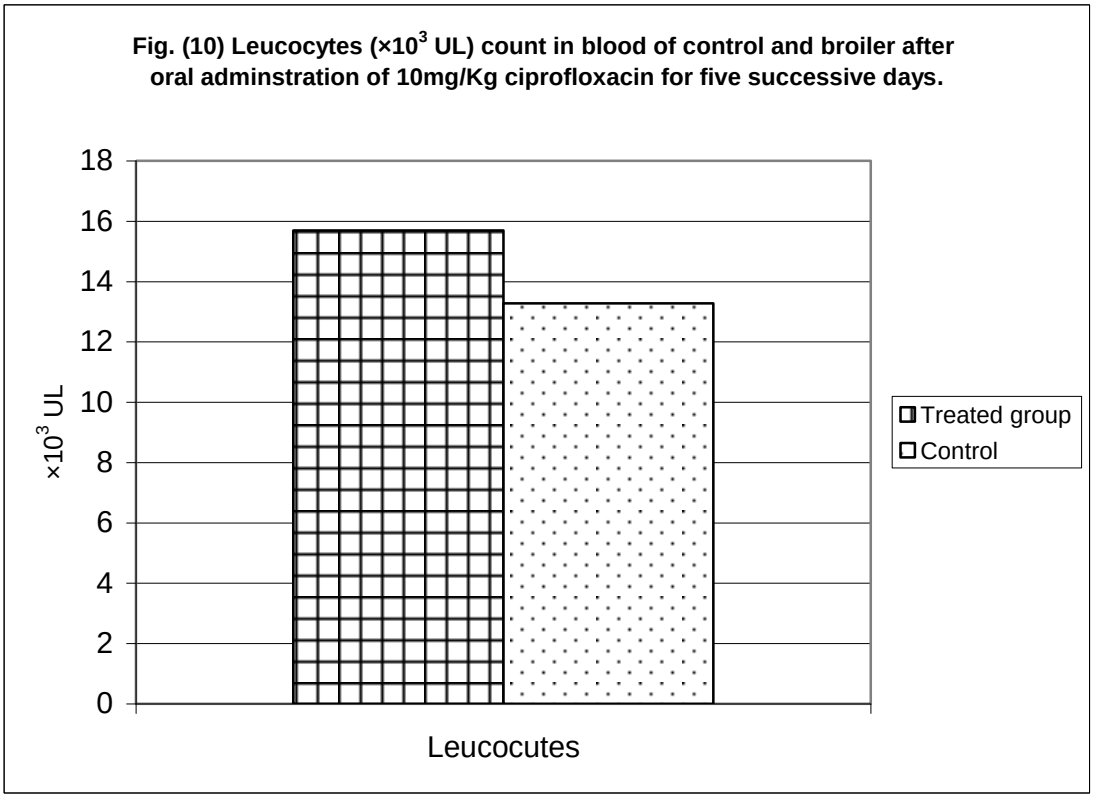


Table (19) Monocytes, Esinophils and basophils percentage of blood of broiler after oral administration of 10mg/kg b. wt. ciprofloxacin for five successive days.

Samples / Parameter	Monocytes %		Esinophil %		Basophilis %	
	Test	Control	Test	Control	Test	Control
Min	19	16	0	0	0	0
Max	43	50	2	0	0	0
Mean	29.93 #	27.90 #	0.73	0	0 #	0 #
±SE	1.69	2.56	0.15	0	0	0

Significant difference at P<0.05
#= Nonsignificant difference at P> 0.05

Fig. (11) Monocytes, Esinophils and basophils percentage of blood of control and broiler after oral adminstration of 10mg/Kg ciprofloxacin for five successive days.

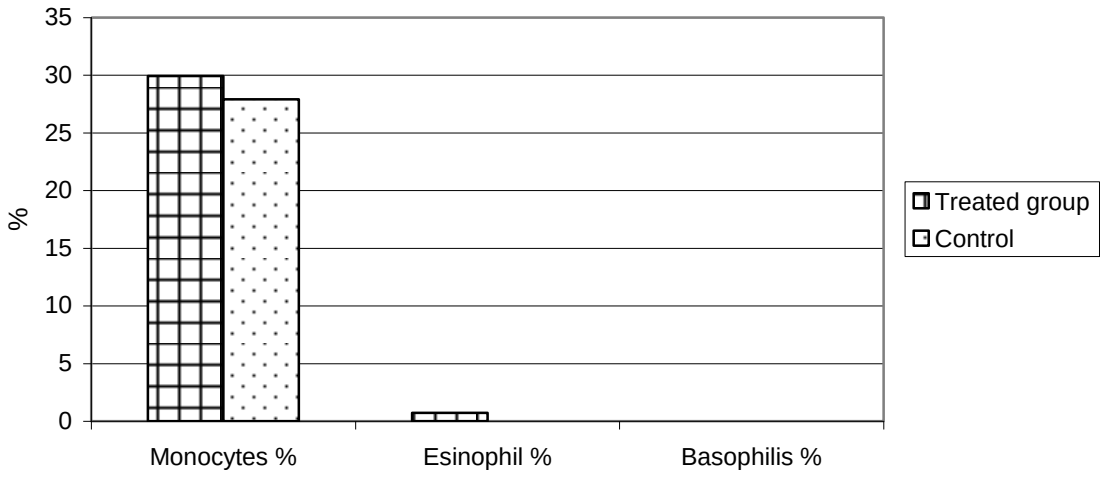


Table (20) Heterophils percentage in blood of broiler after oral administration of 10mg/kg b. wt. ciprofloxacin for five successive days. There were non significant difference at ($p>0.05$) **(fig. (12).**

Table (21) Lymphocytes percentage in blood of broiler after oral administration of 10 mg/kg b. wt. ciprofloxacin for five successive days. There were significant difference at ($p<0.05$) **fig. (13).**

Table (22) Erythrocyte Sedimentation Rate (ESR) in blood of broiler after oral administration of 10mg/kg b. wt. ciprofloxacin for five successive days of 1^{st} and 2^{nd} hours and there were significant difference at ($p<0.05$) **fig. (14).**

Table (20) Heterophils percentage in blood of broiler after oral administration of 10mg/kg b. wt. ciprofloxacin for five successive days.

Samples / Parameter	Test	Control
Min	17	5
Max	35	25
Mean	28 #	21.47 #
±SE	0.39	0.99

#= Nonsignificant difference at P> 0.05

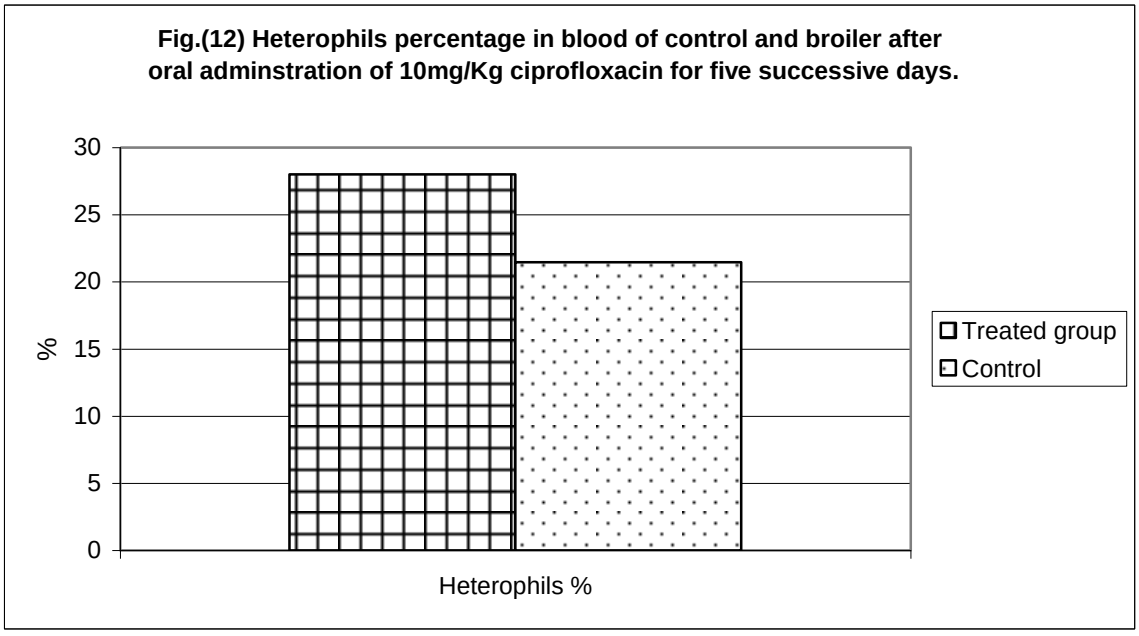


Fig.(12) Heterophils percentage in blood of control and broiler after oral adminstration of 10mg/Kg ciprofloxacin for five successive days.

Table (21) Lymphocytes percentage in blood of broiler after oral administration of 10mg/kg b. wt. ciprofloxacin for five successive days.

Samples / Parameter	Test	Control
Min	25	40
Max	52	62
Mean	42	51.8
±SE	1.98	1.79

Significant difference at P> 0.05

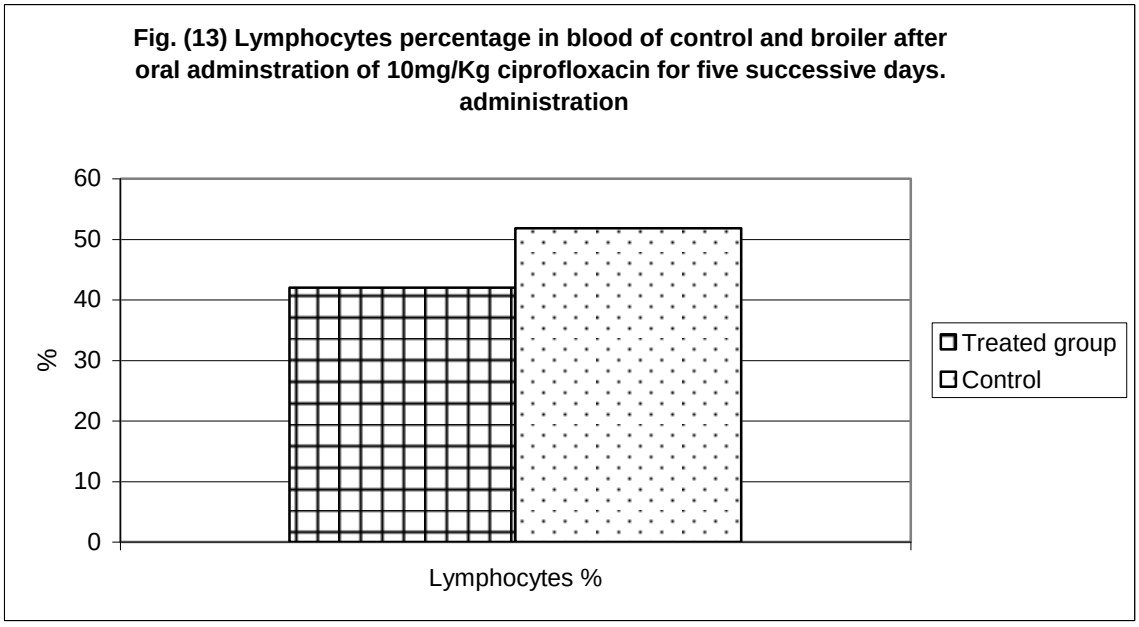


Fig. (13) Lymphocytes percentage in blood of control and broiler after oral adminstration of 10mg/Kg ciprofloxacin for five successive days. administration

Table (22) Erythrocyte Sedimentation Rate (ESR) in blood of broiler after oral administration of 10mg/kg b. wt. ciprofloxacin for five successive days.

Samples / Parameter	Control		Test	
	1st hour	2nd hour	1st hour	2nd hour
Min	3.7	7.0	8.5	16.5
Max	6.7	13.4	15.6	29.5
Mean±SE	4.5±0.2	9.84±0.5	12.0±0.54	21.5±0.9

Significant difference at P> 0.05

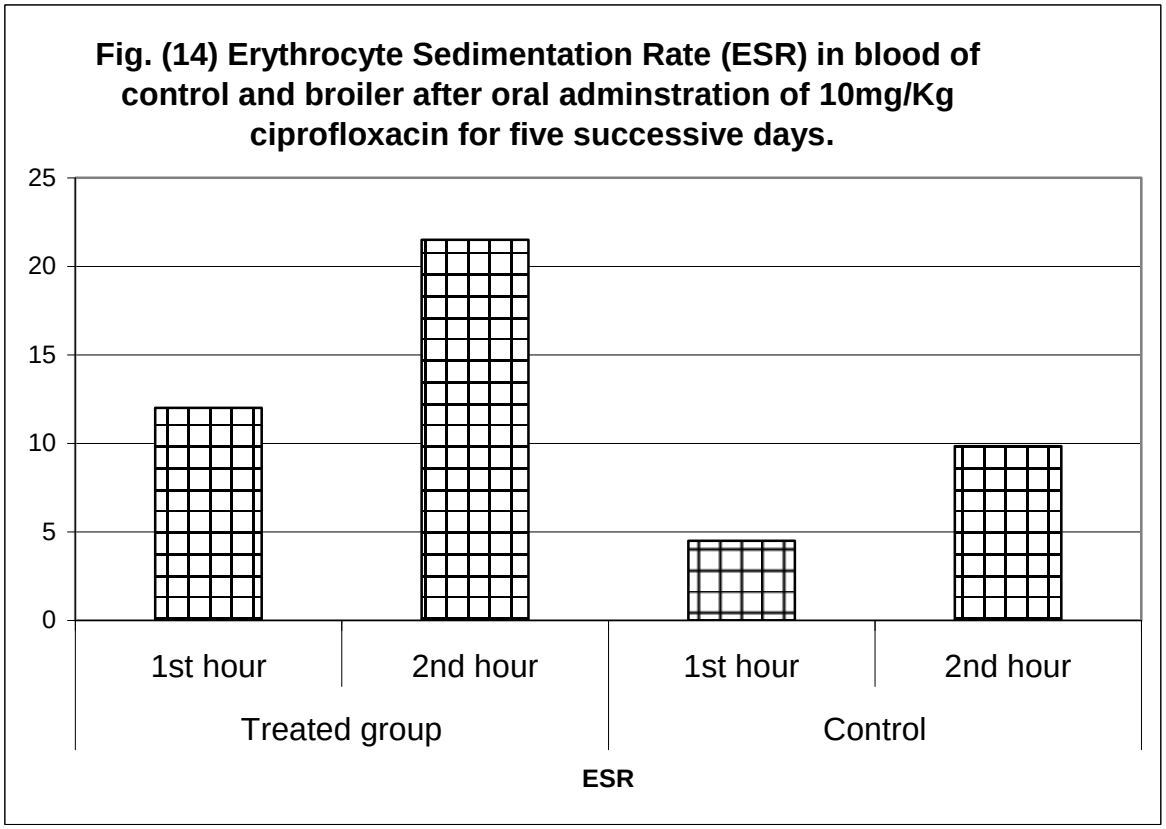


Fig. (14) Erythrocyte Sedimentation Rate (ESR) in blood of control and broiler after oral adminstration of 10mg/Kg ciprofloxacin for five successive days.

Table (23) Serum and tissues (μg/gm) concentrations of ciprofloxacin in chickens following oral administration of 10 mg/kg b wt. for 5 successive days. Mean with different alphabetical letters in the same column are significantly difference at ($p<0.05$).

Table (24) Serum and tissues (μg/gm) concentrations of ciprofloxacin in chickens following I/V 10 mg/kg b wt. for 5 successive days. Mean with different alphabetical letters in the same column are significantly difference at ($p<0.05$).

Table (25) Effect of freezing storage on the ciprofloxacin residue in chicken tissues and organs (Mean of three samples). There were significant difference at ($p<0.05$).

Table (26) Effect of heat treatment on ciprofloxacin treated chicken. Mean with different alphabetical letters in the same row are significantly difference at ($p<0.05$).

Table (23) Serum and tissues (µg/gm) concentrations of ciprofloxacin in chickens following oral administration of 10 mg/kg b wt. for 5 successive days.

Sample / Time	Serum	Chest	Thigh	Liver	Kidney	Heart	Gizzard
15 minutes	1.46±0.008 [a]	0.187±0.006[a]	0.21±0.016 [a]	0.63±0.013 [a]	0.21±0.011 [a]	0.18±0.006 [a]	0.31±0.012 [af]
30 minutes	1.58±0.012 [b]	0.21±0.005[b]	0.30±0.012 [b]	0.70±0.007 [b]	0.25±0.003 [b]	0.18±0.007 [a]	0.34±0.008 [ae]
1 hour	1.87±0.005 [c]	0.30±0.11[c]	0.38±0.005 [c]	0.81±0.006 [c]	0.29±0.01 [c]	0.21±0.009 [b]	0.43±0.009 [bec]
2 hours	1.64±0.006 [d]	0.26±0.009[d]	0.30±0.014 [b]	0.71±0.009 [b]	0.25±0.01 [b]	0.21±0.006 [cb]	0.38±0.005 [ac]
4 hours	1.56±0.02 [b]	0.25±0.008[d]	0.29±0.013 [bf]	0.66±0.009 [e]	0.23±0.006 [ab]	0.18±0.006 [a]	0.33±0.007 [acg]
6 hours	1.42±0.011 [f]	0.21±0.01[b]	0.27±0.009 [f]	0.62±0.008 [a]	0.24±0.005 [b]	0.18±0.009 [a]	0.30±0.006 [fg]

Mean with different alphabetical letters in the same column are significantly difference at ($P<0.05$).

Table (24) Serum and tissues (μg/gm) concentrations of ciprofloxacin in chickens following I/V 10 mg/kg b wt. for 5 successive days.

Time \ Sample	Serum	Chest	Thigh	Liver	Kidney	Heart	Gizzerd
15 minutes	2.35±0.01 ^{a}	0.42±0.01 ^{a}	0.383±0.01 ^{a}	1.05±0.01 ^{a}	0.42±0.01 ^{a}	0.31±0.01 ^{acdef}	0.577±0.01 ^{a}
30 minutes	2.17±0.01 ^{b}	0.388±0.01 ^{b}	0.354±0.01 ^{a}	0.972±0.01 ^{b}	0.381±0.01 ^{b}	0.271±0.01 ^{a}	0.535±0.01 ^{b}
1 hour	1.90±0.01 ^{c}	0.34±0.01 ^{c}	0.31±0.01 ^{bc}	0.851±0.01 ^{c}	0.33±0.01 ^{ac}	0.23±0.01 ^{cg}	0.468±0.01 ^{c}
2 hours	1.78±0.01 ^{d}	0.321±0.01 ^{c}	0.29±0.01 ^{cf}	0.79±0.01 ^{d}	0.31±0.01 ^{ad}	0.21±0.01 ^{dg}	0.434±0.01 ^{d}
4 hours	1.66±0.01 ^{e}	0.281±0.01 ^{ef}	0.27±0.01 ^{df}	0.73±0.01 ^{e}	0.29±0.01 ^{ae}	0.20±0.01 ^{eg}	0.402±0.01 ^{e}
6 hours	1.58±0.01 ^{f}	0.26±0.01 ^{f}	0.26±0.01 ^{ef}	0.69±0.01 ^{f}	0.28±0.01 ^{af}	0.18±0.01 ^{fg}	0.379±0.01 ^{f}

Mean with different alphabetical letters in the same column are significantly difference at ($P<0.05$).

Table (25) Effect of freezing storage on the ciprofloxacin residue in chicken tissues and organs (Mean of three samples)

Time / Sample	1st month	2nd month	3rd month	4th month	5th month	6th month
Chest	0.42 a	0.280 b	0.070 c	0.050 c	0.050 c	0.0 f
Thigh	0.383 a	0.220 b	0.080 c	0.042 d	0.042 d	0.0 f
Liver	1.05 a	0.485 b	0.350 c	0.126 d	0.124 d	0.12 fd
Kidney	0.43 a	0.135 b	0.020 c	0.0 c	0.0 c	0.0 c
Heart	0.31 a	0.136 b	0.030 c	0.0 d	0.0 d	0.0 d
Gizzard	0.577 a	0.386 b	0.270 c	0.180 d	0.120 e	0.110 e

Mean with different alphabetical letters in the same row are significantly difference at ($P<0.05$).

Table (26) Effect of heat treatment on ciprofloxacin treated chicken.

Treatment / Sample	Before heat treatment	After boiling for 30 min	After roasting for 30 min at 150°C	After frying for 15 min in cotton seed oil
Chest	0.352±0.0018 [a]	0.03±0.0058 [b]	0.037±0.002 [b]	0.047±0.0088 [b]
Thigh	0.293±0.0019 [a]	0.037±0.0012 [b]	0.037±0.0012 [b]	0.035±0.0008 [b]
Liver	0.854±0.0021 [a]	0.196±0.0017 [b]	0.177±0.0012 [b]	0.17±0.011 [b]
Kidney	0.667±0.0088 [a]	0.078±0.0012 [b]	0.07±0.01 [b]	0.065±0.0015 [b]
Heart	0.293±0.0015 [a]	0.0 [b]	0.0 [b]	0.0 [b]
Gizzard	0.253±0.0015 [a]	0.0 [b]	0.0 [b]	0.0 [b]

Mean with different alphabetical letters in the same row are significantly difference at ($P<0.05$).