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INDUCED TOXIC EFFECT OF LEAD ACETATE ON HAEMATOLOGY OF ROCK PIGEON (*COLUMBA LIVIA* GMELIN)

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ABSTRACT

The study was conducted to evaluate the effect of lead on haematological parameters at different doses in Rock pigeon (*Columba livia* Gmelin). The heavy metal used was lead in compound form as lead acetate. Thirty six birds (12 birds each) were divided into three groups and one group was kept as control whereas other two groups were orally administered with weak dose (5 g/kg body weight / day) and strong dose (10 g/kg body weight / day) of lead acetate, respectively. The experiment was repeated after every three months up to three years. In 2009, strong dose caused significant decrease in level of Hb, RBC, PCV, Platelets, WBC, Lymphocytes and Monocytes against control group whereas level of Neutrophils increased significantly. In case of MCV, MCH, MCHC, Eosinophil and Basophils, strong dose caused non-significant effects. In 2010, strong dose caused significant decrease in level of Hb, RBC, PCV, Platelets, WBC, Lymphocytes, Monocytes and Eosinophils against control group whereas level of MCH, MCHC and Neutrophils increased significantly. In case of MCV and Basophils, strong dose caused non-significant effects. In 2011, strong dose caused significant decrease in level of Hb, RBC, PCV, Platelets, WBC, Lymphocytes and Monocytes against control group whereas level of MCV, MCH and Neutrophils increased significantly. In case of MCHC, Eosinophil and Basophils, strong dose caused non-significant effects. The above results revealed that strong dose of lead acetate caused alteration in haematology and produced lethal effects in Rock Pigeon.

Keywords: Lead acetate, haematology, Rock pigeon.

INTRODUCTION

Biological monitoring of trace metals can provide a valuable contribution to occupational or environmental health program if the scope and limitations of analytical methods are recognized. Lead is used in variety of industrial and commercial products, mainly storage batteries, solders, plumbing and gasoline. Various lead compounds are continuously polluting the environment contaminating human lives and livestock through wall paints, water pipes, house ware decorations, lead crystal wares, power plant scrubbers and inadequate poultry feed etc. On the other hand, lead is also found in some traditional ethnic medicines (Landrigan and Todd, 1994). Much of the lead comes from air borne contamination (Esterman and Maynard, 1998) falling on agriculture crops. Vegetables usually storing most of the lead in their roots and leaves and the least in their fruits and grains. Thus soil contaminations as well as air and water pollution may contribute lead to a great amount. Environmental lead pollution is widely regarded as a risk to health of all living beings.

The contamination of our environment with pesticide and other pollutants including heavy metals has been a subject of concern for the last several decades (Vuorinen and Yki, 1994). The highly stable residues of heavy metals are potential hazards to human health including wild life.

Accumulation of these residues and their effects on the living environment are also being reported from different continents. Administration with strong dose of lead compounds or long term treatment in poultry albumen, mice and rats have been reported to cause weight loss, tremor, hepatic injury and eventual death of the animal. Lead gains entry into non-target animal systems and transformed generally by the liver mixed function oxygenase system into different metabolities, thus frequently causing serious consequences.

The Rock Pigeon (*Columba livia* Gmelin) is very important to overall ecosystem balance. It is most widely distributed bird may behaves as predatory and also a very sentient game bird (Friberg and Kiellstrom,1986 and WHO 1992).

Effects of lead poisoning in many birds including domestic fowl, water fowl, swan, duck, gheese, ring dove, birds of prey, and sea birds have been published, showing the detrimental effects of heavy metals on behavioural, autonomic and neuro-endocrine functions of birds.

Haematological profiles both in human and in animal science are an important index of the physiological state of the individual. The ability to interpret the state of blood profile in normal and in diseased conditions is among its primary task. (Juhn and Domm 1930, Taber *et al*., 1943, Wintobe, 1956, Washburn and Myers 1957, Sturkie and Textor, 1960, Prankred, 1961, Gilbert, 1962, Siegel, 1968, Khan *et al*., 1987). Most workers have studied the avian

blood and found a great degree of variation for R.B.C and considered it to be normal (Chubb and Rowell, 1959). It was concluded after an extensive study that R.B.C and other parameters as Hb and E.S.R of a bird vary among species, other factors which affect the counts include breed, sex and nutrition supplied to the birds (Sturkie, 1965).

In view of the above hazards of lead poisoning, the aim of the present study was to evaluate the toxicity induced by oral administration of lead compound, an environmental pollutant on aerial bird (*Columa livia*).

MATERIALS AND METHODS

COLLECTION AND ACCLIMATIZATION OF ANIMALS:

Rock Pigeon (*Columba livia*) were purchased from the local market and were brought to the laboratory. These birds were kept in cages and provided with water and feed *ad labitum*. The body weight of the normal birds was recorded and was acclimatized for initial 15 days before starting experiments.

TOXICANT USED:

Lead acetate powder was purchased from the local market and experimental doses were prepared by dissolving 5 g and 10 g of lead acetate in 100 ml of distilled water respectively.

METHOD OF TREATMENT:

After two weeks period of acclimatization, the pigeons were divided into three groups. First group was administered with weak dose (5 g/kg body weight / day), whereas second group was fed with strong dose (10 g/kg body weight / day) with the help of disposable syringes attached to rubber tubing. The third group of chicks maintained as control, was administered with equal amount of distilled water. The weight of animals was recorded after every 24 hours throughout the experimental period.

COLLECTION AND ANALYSIS OF BLOOD:

The blood would be collected from pectoral vein of pigeon for haematological analysis. The result were recorded and statistically analysed.

HAEMATOLOGICAL STUDIES:

Anticoagulant (EDTA) would be added to the blood tubes to avoid coagulation of the blood. This sample would be used for the estimation of haemoglobin content according to Van Kampan and Zijlstra (1961) and other parameters viz. total erythrocyte count (TEC), total leucocyte count (TLC), packed cell volume (PCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC), mean corpuscular volume (MCV) would be estimated according to routine haematological techniques (Dacie and Lewis, 1977).

RESULTS AND DISCUSSION

It is quite obvious that when any chemical enters the body, it is transported through the blood to different parts of body (Deichmann *et al* 1968). Blood is the first tissue to be affected as it is transport carrier of all the metabolic products. As a result, several harmful effects on haematological parameters have been reported in different animals by different authors (Lone and Javaid, 1976; Moss and Hathway, 1964).

The avian haematology proves to be quite significant in diagnostic purposes although there are great variations in standard values of RBC, WBC and platelets count depending upon the quality of feed, age, weight and other environmental factors. These parameters variations also indicate the response of organism under stress environmental conditions. Due to lead, severe haemolytic crisis are observed like anaemia, haemoglobinuria and stippling of red blood cells in mammals (Albahary, 1972).

Effects of Strong dose of Lead acetate show decrease in blood parameter values. Chubb and Rowell (1959) found that RBCs were affected by toxic metals. The effects of heavy metals and found alterations in the values of blood parameters after application of heavy metal dose in birds (Cooper *et al.,* 1986; Victery, 1988; Khandelwal *et al.,* 1991; Bordel and Hasse, 1993; Lashev *et al.,* 2009; Denise *et al.,* 2000 and Francisco *et al.,* 2003).

The exposure of lead acetate shows significant changes in blood of Rock pigeon. A significant ($P<0.001$) decrease in Hb is due to inhibitory effects of toxicant on the enzyme system in the synthesis of Hb (Table 1). A significant decrease ($P<0.001$) in RBC after exposure to lead was an indication of inhibited production of RBC caused by erythrocyte destruction (Table 2). PCV values are important in determining the effects of stressor on health and oxygen carrying capacity of blood (Larson *et al.,* 1985). Ohiet *et al* (1980) also studied the effects of heavy metals on blood parameters and found that haematocrit was decreased.

Table 1. Toxic effects of Lead Acetate on Hb (g/dl) values in Rock Pigeon after treatment with weak dose and strong dose during experimental duration.

Parameter	Month	Treatment	Mean 2009	S.E	Mean 2010	S.E	Mean 2011	S.E
Hb	Jan – Mar	Control	12.89	0.40	11.37	0.96	12.85	0.91
		Weak dose	9.08	0.39	9.08	0.39	9.96	0.80
		Strong dose	7.17	0.09	6.79	0.52	7.39	0.73
	Apr – Jun	Control	12.63	0.53	12.61	0.77	12.20	0.28
		Weak dose	8.84	0.24	8.84	0.24	8.65	0.37
		Strong dose	7.06	0.14	6.61	0.41	6.65	0.39
	Jul – Sep	Control	13.35	0.53	13.26	0.27	13.22	0.56
		Weak dose	9.82	0.68	9.82	0.68	8.66	0.31
		Strong dose	7.12	0.34	7.57	0.30	6.42	0.32
	Oct – Dec	Control	11.86	0.35	11.67	0.55	12.21	0.18
		Weak dose	8.66	0.37	8.66	0.37	8.52	0.44
		Strong dose	6.45	0.33	5.97	0.24	6.51	0.37

Table 2. Toxic effects of Lead Acetate on RBC (10^6cells/mm^3) values in Rock Pigeon after treatment with weak dose and strong dose during experimental duration.

Parameter	Month	Treatment	Mean 2009	S.E	Mean 2010	S.E	Mean 2011	S.E
RBC	Jan – Mar	Control	3.23	0.11	2.98	0.16	3.17	0.17
		Weak dose	2.31	0.12	2.31	0.12	2.25	0.16
		Strong dose	1.92	0.08	1.73	0.23	1.80	0.09
	Apr – Jun	Control	3.06	0.04	2.99	0.23	3.03	0.06
		Weak dose	1.96	0.13	1.96	0.13	2.19	0.08
		Strong dose	1.47	0.07	1.13	0.17	1.38	0.14
	Jul – Sep	Control	3.12	0.08	2.93	0.08	3.28	0.08
		Weak dose	1.93	0.20	1.93	0.20	2.13	0.08
		Strong dose	1.40	0.13	1.24	0.15	1.13	0.09
	Oct – Dec	Control	3.04	0.10	3.06	0.10	3.43	0.23
		Weak dose	1.96	0.14	1.96	0.14	1.93	0.04
		Strong dose	1.81	0.25	1.22	0.20	0.89	0.08

Table 3. Toxic effects of Lead Acetate on PCV (%) values in Rock Pigeon after treatment with weak dose and strong dose during experimental duration.

Parameter	Month	Treatment	Mean 2009	S.E	Mean 2010	S.E	Mean 2011	S.E
PCV	Jan - Mar	Control	48.03	2.85	45.73	3.62	51.47	1.34
		Weak dose	34.27	3.94	34.27	3.94	41.53	1.12
		Strong dose	26.93	3.05	25.80	3.78	29.27	1.33
	Apr - Jun	Control	46.63	1.98	46.80	2.21	44.47	3.07
		Weak dose	31.20	0.81	31.20	0.81	31.63	2.53
		Strong dose	21.67	0.94	19.87	1.32	22.37	1.55
	Jul - Sep	Control	44.60	2.05	44.63	2.71	39.50	1.96
		Weak dose	30.23	1.34	30.23	1.34	29.77	1.02
		Strong dose	22.70	1.77	20.07	1.72	20.23	1.76
	Oct - Dec	Control	44.80	1.72	46.70	2.73	37.37	1.38
		Weak dose	30.17	1.20	30.17	1.20	25.53	3.70
		Strong dose	21.90	2.56	21.13	1.87	18.20	2.25

Table 4. Toxic effects of Lead Acetate on MCV (fl) values in Rock Pigeon after treatment with weak dose and strong dose during experimental duration.

Parameter	Month	Treatment	Mean 2009	S.E	Mean 2010	S.E	Mean 2011	S.E
MCV	Jan - Mar	Control	148.60	4.19	153.33	9.99	162.63	4.54
		Weak dose	149.70	21.01	149.70	21.01	187.07	17.46
		Strong dose	139.67	10.74	149.30	12.95	162.30	0.47
	Apr - Jun	Control	152.27	6.96	157.50	7.83	146.87	9.89
		Weak dose	159.97	6.43	159.97	6.43	144.57	10.22
		Strong dose	148.13	12.53	182.80	25.53	163.43	5.70
	Jul - Sep	Control	142.93	3.30	152.60	10.73	120.50	5.16
		Weak dose	159.97	18.57	159.97	18.57	140.00	5.93
		Strong dose	165.00	23.06	168.93	33.98	182.70	28.00
	Oct - Dec	Control	147.53	4.11	153.00	9.59	109.60	6.93
		Weak dose	154.87	8.26	154.87	8.26	131.57	16.82
		Strong dose	121.70	4.70	188.57	48.78	209.17	35.61

Table 5. Toxic effects of Lead Acetate on MCH (pg) values in Rock Pigeon after treatment with weak dose and strong dose during experimental duration.

Parameter	Month	Treatment	Mean 2009	S.E	Mean 2010	S.E	Mean 2011	S.E
MCH	Jan - Mar	Control	39.98	0.87	38.01	1.51	40.42	0.73
		Weak dose	39.66	3.33	39.66	3.33	44.32	2.51
		Strong dose	37.54	1.38	40.07	3.74	40.80	2.16
	Apr - Jun	Control	41.21	1.47	42.42	2.56	40.29	0.11
		Weak dose	45.60	4.08	45.60	4.08	39.57	1.28
		Strong dose	48.11	2.36	60.27	5.27	48.81	3.18
	Jul - Sep	Control	42.82	0.77	45.27	0.93	40.30	0.92
		Weak dose	52.30	7.65	52.30	7.65	40.83	2.51
		Strong dose	51.89	6.46	63.57	11.24	57.41	4.55
	Oct - Dec	Control	39.20	2.39	38.33	2.73	35.84	2.16
		Weak dose	44.49	2.90	44.49	2.90	44.10	2.50
		Strong dose	36.51	3.49	52.42	10.78	74.69	9.13

Table 6. Toxic effects of Lead Acetate on MCHC (g/dl) values in Rock Pigeon after treatment with weak dose and strong dose during experimental duration.

Parameter	Month	Treatment	Mean 2009	S.E	Mean 2010	S.E	Mean 2011	S.E
MCHC	Jan - Mar	Control	26.97	1.31	25.09	2.46	24.91	1.10
		Weak dose	26.95	2.19	26.95	2.19	24.04	2.18
		Strong dose	27.35	3.21	27.39	3.96	25.14	1.37
	Apr - Jun	Control	27.11	0.96	27.04	1.94	27.67	1.87
		Weak dose	28.39	1.46	28.39	1.46	27.50	1.04
		Strong dose	32.69	1.41	33.45	2.11	29.80	0.95
	Jul - Sep	Control	29.97	0.81	29.97	2.22	33.51	1.04
		Weak dose	32.42	1.15	32.42	1.15	29.12	0.83
		Strong dose	31.78	3.20	38.18	2.96	32.48	4.42
	Oct - Dec	Control	26.56	1.44	25.05	1.10	32.77	1.42
		Weak dose	28.82	1.95	28.82	1.95	34.28	3.45
		Strong dose	29.93	2.23	28.47	1.34	36.32	2.30

Table 7. Toxic effects of Lead Acetate on Platelet (10^3cells/mm^3) values in Rock Pigeon after treatment with weak dose and strong dose during experimental duration.

Parameter	Month	Treatment	Mean 2009	S.E	Mean 2010	S.E	Mean 2011	S.E
Platelets	Jan - Mar	Control	13.27	0.29	11.87	0.58	12.60	0.57
		Weak dose	11.63	0.69	11.63	0.69	11.33	0.41
		Strong dose	10.07	0.68	7.43	0.82	8.77	0.23
	Apr - Jun	Control	13.33	0.48	12.07	0.18	12.70	0.46
		Weak dose	10.83	0.19	10.83	0.19	9.80	0.23
		Strong dose	8.43	0.33	7.10	0.38	7.67	0.58
	Jul - Sep	Control	13.27	0.75	13.90	0.67	13.43	0.54
		Weak dose	11.27	0.35	11.27	0.35	9.60	0.32
		Strong dose	9.17	0.46	6.80	0.47	7.57	0.46
	Oct - Dec	Control	13.40	0.26	12.57	0.62	13.00	0.36
		Weak dose	11.87	0.24	11.87	0.24	8.33	0.32
		Strong dose	9.07	0.15	6.90	0.68	6.80	0.26

Table 8. Toxic effects of Lead Acetate on WBC (10^3cells/mm^3) values in Rock Pigeon after treatment with weak dose and strong dose during experimental duration.

Parameter	Month	Treatment	Mean 2009	S.E	Mean 2010	S.E	Mean 2011	S.E
WBC	Jan - Mar	Control	13.92	0.77	11.99	0.67	12.53	0.62
		Weak dose	84.20	4.40	84.20	4.40	136.50	25.57
		Strong dose	6.93	0.89	7.85	1.13	7.53	0.72
	Apr - Jun	Control	13.43	0.61	12.03	0.22	13.93	0.57
		Weak dose	93.17	10.72	93.17	10.72	80.58	4.89
		Strong dose	8.49	1.21	7.38	0.44	7.30	0.97
	Jul - Sep	Control	11.95	0.26	13.19	0.14	13.93	0.65
		Weak dose	76.83	5.37	76.83	5.37	86.82	12.32
		Strong dose	8.62	2.56	7.52	0.81	8.64	1.29
	Oct - Dec	Control	12.37	0.34	11.80	0.49	13.42	0.34
		Weak dose	75.15	6.93	75.15	6.93	110.07	12.52
		Strong dose	5.93	0.43	10.52	2.84	7.40	0.47

Table 9. Toxic effects of Lead Acetate on Lymphocyte (%) values in Rock Pigeon after treatment with weak dose and strong dose during experimental duration.

Parameter	Month	Treatment	Mean 2009	S.E	Mean 2010	S.E	Mean 2011	S.E
Lymphocyte	Jan - Mar	Control	62.10	1.68	59.03	2.32	63.20	0.75
		Weak dose	39.07	3.38	39.07	3.38	37.23	4.49
		Strong dose	25.60	2.27	27.93	2.70	26.30	2.42
	Apr - Jun	Control	60.20	0.64	57.93	3.02	62.53	1.72
		Weak dose	41.67	1.64	41.67	1.64	44.90	5.82
		Strong dose	31.07	0.67	30.60	0.96	24.27	3.34
	Jul - Sep	Control	56.07	2.02	57.83	1.33	58.37	1.32
		Weak dose	40.53	1.58	40.53	1.58	44.07	2.40
		Strong dose	31.53	1.54	30.17	2.40	31.30	2.40
	Oct - Dec	Control	59.03	1.09	56.83	2.90	60.03	1.05
		Weak dose	42.17	2.71	42.17	2.71	42.97	1.56
		Strong dose	32.53	1.47	29.03	3.48	23.93	2.35

Table 10. Toxic effects of Lead Acetate on Monocyte (%) values in Rock Pigeon after treatment with weak dose and strong dose during experimental duration.

Parameter	Month	Treatment	Mean 2009	S.E	Mean 2010	S.E	Mean 2011	S.E
Monocyte	Jan - Mar	Control	6.00	0.42	7.73	0.52	6.87	0.54
		Weak dose	4.90	0.53	4.90	0.53	5.33	0.49
		Strong dose	3.10	0.30	2.77	0.28	3.77	1.04
	Apr - Jun	Control	6.97	0.35	7.47	0.48	6.70	0.26
		Weak dose	5.13	0.34	5.13	0.34	5.27	0.35
		Strong dose	3.33	0.34	3.10	0.36	2.63	0.55
	Jul - Sep	Control	6.80	0.29	7.33	0.72	6.90	0.50
		Weak dose	6.17	0.56	6.17	0.56	6.33	0.55
		Strong dose	3.87	0.18	2.97	0.58	2.70	0.80
	Oct - Dec	Control	6.53	0.38	6.67	0.27	6.37	0.17
		Weak dose	4.67	0.20	4.67	0.20	5.20	0.25
		Strong dose	3.17	0.48	2.63	0.38	2.83	0.09

Table 11. Toxic effects of Lead Acetate on Neutrophil (%) values in Rock Pigeon after treatment with weak dose and strong dose during experimental duration.

Parameter	Month	Treatment	Mean 2009	S.E	Mean 2010	S.E	Mean 2011	S.E
Neutrophil	Jan - Mar	Control	26.87	2.19	27.93	2.40	24.47	1.03
		Weak dose	51.27	3.54	51.27	3.54	52.30	4.50
		Strong dose	66.77	2.22	64.27	3.07	64.93	1.69
	Apr - Jun	Control	28.13	0.80	28.73	2.28	25.97	1.44
		Weak dose	48.77	1.31	48.77	1.31	45.50	6.57
		Strong dose	61.43	0.37	61.10	1.10	68.50	3.32
	Jul - Sep	Control	32.70	2.06	29.30	1.25	29.23	1.62
		Weak dose	49.20	1.45	49.20	1.45	44.60	2.86
		Strong dose	61.00	1.64	61.87	2.07	61.80	1.47
	Oct - Dec	Control	29.43	1.04	30.80	3.26	28.70	1.52
		Weak dose	49.07	3.06	49.07	3.06	47.23	0.90
		Strong dose	60.27	1.88	63.57	3.41	68.90	2.75

Table 12. Toxic effects of Lead Acetate on Eosinophil (%) values in Rock Pigeon after treatment with weak dose and strong dose during experimental duration.

Parameter	Month	Treatment	Mean 2009	S.E	Mean 2010	S.E	Mean 2011	S.E
Eosinophil	Jan - Mar	Control	3.40	0.66	3.47	0.32	4.17	0.91
		Weak dose	2.97	0.44	2.97	0.44	3.83	0.52
		Strong dose	2.80	0.35	3.27	0.38	3.83	0.66
	Apr - Jun	Control	3.13	0.37	4.23	0.34	3.07	0.44
		Weak dose	2.83	0.12	2.83	0.12	2.93	0.27
		Strong dose	2.67	0.07	3.63	0.23	2.63	0.23
	Jul - Sep	Control	2.63	0.37	3.43	0.19	3.70	0.46
		Weak dose	2.40	0.35	2.40	0.35	3.27	0.24
		Strong dose	1.90	0.51	3.03	0.32	2.53	0.41
	Oct - Dec	Control	3.33	0.35	3.73	0.15	3.27	0.26
		Weak dose	2.53	0.32	2.53	0.32	3.03	0.26
		Strong dose	2.47	0.29	3.20	0.17	2.83	0.18

Table 13. Toxic effects of Lead Acetate on Basophil (%) values in Rock Pigeon after treatment with weak dose and strong dose during experimental duration.

Parameter	Month	Treatment	Mean 2009	S.E	Mean 2010	S.E	Mean 2011	S.E
Basophil	Jan - Mar	Control	1.63	0.09	1.80	0.49	1.30	0.29
		Weak dose	1.77	0.12	1.77	0.12	1.30	0.25
		Strong dose	1.73	0.03	1.77	0.43	1.17	0.27
	Apr - Jun	Control	1.57	0.15	1.63	0.19	1.73	0.37
		Weak dose	1.60	0.06	1.60	0.06	1.70	0.25
		Strong dose	1.50	0.17	1.57	0.13	1.97	0.15
	Jul - Sep	Control	1.80	0.25	2.10	0.15	1.80	0.06
		Weak dose	1.70	0.21	1.70	0.21	1.73	0.15
		Strong dose	1.70	0.21	1.97	0.09	1.63	0.12
	Oct - Dec	Control	1.67	0.09	1.97	0.03	1.63	0.27
		Weak dose	1.57	0.12	1.57	0.12	1.57	0.28
		Strong dose	1.57	0.07	1.57	0.12	1.50	0.25

In present study the low PCV values (Table 3) indicate anaemia whereas MCV shows non-significant effects on blood parameters (Table 4). Values of MCH quite dissimilar in present study like decreased values in some cases indicated reduced RBC size or decreased biosynthesis of haemoglobin in bone marrow (Table 5, 6). Leucocytosis is directly proportional to the severity of stress conditions (Srivastava and Narain, 1982). In case of weak dose, the prominent increase in WBC indicates activation of defense mechanism and immune system whereas high dose shows significant and sudden decrease in WBC count (Table 8).

Platelets values in pigeon blood significantly ($P<0.001$) decreased with strong dose of lead acetate (Table 7). Strong dose of lead acetate showed maximum decrease in Platelets values when applied orally. Values of Lymphocytes and monocytes are significantly decreased with the exposure of strong dose of lead acetate (Table 9, 10). Neutrophils show higher values after exposure of strong dose of lead acetate (Table 11), very much similar to other authors like Hoffman *et al.* (1981) also described that after administration of lead shots, values of some parameters increased or decreased. Strong dose of lead acetate shows non-significant effects on basophils and eosinophils (Table 12, 13).

Conclusively, toxic level of lead acetate may cause a variety of disorders resulting even death in several cases in animals and humans. Narbaitz *et al.* (1985) and Lumeij (1987) were found that lead cause lesions in birds and effects on kidneys of birds. Hence the biological monitoring of trace metal including lead can provide a valuable contribution to human health and occupational and environmental health progress.

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