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Effect of lead and thiram toxicity on body weights of broilers

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Abstract
Lead (Pb), a ubiquitous metal, is one of the most abundant elements present on earth. Thiram (Tetramethyl thiuram disulfide – TMTD) is a systemic fungicide and seed protectant. Both had synergistic cytotoxicity. The experiment was designed to study the pathology of lead acetate, tetramethyl thiuram disulfide and its combination induced toxic effects in broilers. hundred day old broiler chicks (*Vencobb* strain) weighing 45-50g were procured from M/S Venkateshwara Hatcheries Pvt. Ltd., Hyderabad. They were divided into four groups, 25chicks in each group. The group 1 (control) fed with basal diet, group 2 (lead acetate) at the rate of 300 ppm per day, group 3 (tetramethyl thiuram disulfide) at the rate of 60 ppm per day and group 4 birds were fed with combination of lead acetate and tetramethyl thiuram disulfide with same dose. The duration of experiment for 5 weeks and the age of the birds were 6 weeks (first week for acclimatization). Average body weights were recorded at weekly intervals (1-6 weeks). A significant (P<0.05) reduction in the body weights were recorded in groups 2, 3 and 4 over group 1 birds.

Keywords: Bodyweights, broilers, lead acetate, tetramethyl thiuramdisulfide

Introduction
Lead is one of the earliest metals discovered by humanbeing. The Latin name of the lead is *plumbum* and the abbreviation is used as Pb. Lead, is one of the oldest known metals and most widespread toxicants, and its poisoning remains a health threat. Lead toxicity occurs when an animal or a bird inhales or ingests a concentrated source of lead [13]. Orally administered Pb absorption is less. However, due to its slow rate of elimination, harmful levels of Pb can accumulate in tissues after prolonged exposure to low quantities [3]. Decrease in body weight gain in lead acetate treated group in which lead acetate was given at a dose of 320 mg/Kg diet for a period of 28 days in broiler chicks [1]. In agricultural practice, the TMTD is used as one of the most effective seed protectant and also used for grain storage. TMTD is avialble both in the form of powder and slurry. The popular name of TMTD is thiram and trade names include Arasan, Fernasan, Nomersan, Fomarsol, Tersan, Thiosan, Thiuramyl, Thiuram, and Thyrid-75 WP [11]. Thiram, as a protective dithiocarbamate and a systemic fungicide, is widely used for foliar treatment in fruits, vegetables, and ornamentals to control a number of fungal diseases [18]. Depressed and poor body condition in TMTD (50 mg/Kg/day) induced TD chickens with reduced growth during 7 to 10 days when compared to broiler chicken of control group [9].
In view of the above, the present study was designed to evaluate the toxic effects of individual (lead and thiram), combination of these compounds in Vencobb broiler chicks.

Materials and Methods
Chemicals
Lead acetate (PbAc) obtained from Thermo Fisher Scientific India Pvt. Ltd., Mumbai, and thiram obtained from Seed Research and Technology Centre (SRTC) Professor Jayashankar Telangana State Agriculture University (PJTSAU).
Experimental animals: Hundred day old broiler chicks were procured from M/S Venkateshwara Hatcheries Pvt, Ltd, Hyderabad were randomly divided into 4 groups each group consisting of 25 chicks. Group 1(control) was given basal diet, group 2 (lead group) was lead acetate (obtained from Thermo Fisher Scientific India Pvt. Ltd., Mumbai) @ 300 ppm daily in feed, group 3 was given TMTD (obtained from Seed Research and Technology Centre (SRTC) Professor Jayashankar Telangana State Agriculture University (PJTSAU), Rajendranagar) @ 60 ppm daily in feed and group 4 birds were fed with combination of PbAc + TMTD with same dose. The duration of experiment was for 5 weeks.

The experiment was carried out according to the guidelines and prior approval of the Institutional Animal Ethics Committee (IAEC-No. I / 2018 - 36).

Methods

The body weights were recorded for a period of 6 weeks using electronic weighing machine.

Statistical Analysis

Data obtained were subjected for statistical analysis by applying one way Analysis of variance (ANOVA) using statistical package for social sciences (SPSS) version 16.0. Differences between means were tested by using Duncan's multiple comparison tests and significance level was set at $P < 0.05$ [15].

Results

Effect of PbAc and TMTD on weekly body weights (g)

Significantly ($P<0.05$) lower mean value was recorded in groups 2 (158 ± 5.266, 290 ± 3.568, 485.83 ± 62.382, 911.5 ± 62.580, 1129.7 ± 46.386 and 1198 ± 41.742) group 3 (133.67 ± 9.200, 237.67 ± 9.783, 533.33 ± 34.630, 1040.5 ± 81.848, 1516.7 ± 41.606 and 1623.3 ± 44.096) and in group 4 (167.33 ± 9.247, 274.83 ± 8.052, 498.83 ± 27.717, 950.33 ± 50.328, 1101.3 ± 79.774 and 1231.2 ± 82.139) comparatively group1 birds showed in Table 1 and Fig 1.

Table 1: Weekly body weights (g) in different groups.

Body weights	Control	PbAc	TMTD	PbAc + TMTD
1st week	142 ± 9.716^{ab}	158± 5.266^{ab}	133.67 ± 9.200^{b}	167.33 ± 9.247^{a}
2nd week	385.5 ± 11.371^{a}	290 ± 3.568^{b}	237.67 ± 9.783^{c}	274.83 ± 8.052^{b}
3rd week	929.33 ± 28.775^{a}	485.83 ± 62.382^{b}	533.33 ± 34.630^{b}	498.83 ± 27.717^{b}
4th week	1352.7 ± 78.547^{a}	911.5 ± 62.580^{b}	1040.5 ± 81.848^{b}	950.33 ± 50.328^{b}
5th week	1797 ± 19.351^{a}	1129.7 ± 46.386^{c}	1516.7 ± 41.606^{b}	1101.3 ± 79.774^{c}
6th week	1890.8 ± 20.784^{a}	1198 ± 41.742^{c}	1623.3 ± 44.096^{b}	1231.2 ± 82.139^{c}

Values are Mean ± SE (n=6); One way ANOVA

Means with different superscripts in a column differ significantly at $P<0.05$ (*)

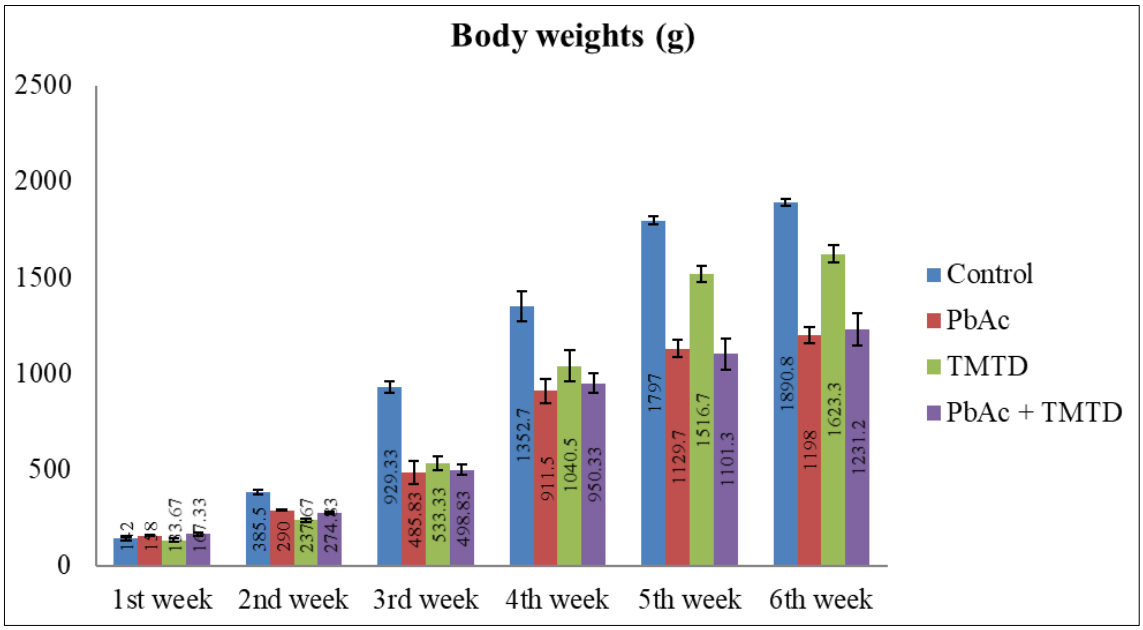

Fig 1: Weekly body weights (g) in different groups

Discussion

Effect of PBAC and TMTD on body weights (g)

In the present study a significant ($P<0.05$) reduction in the body weights were recorded in groups 2, 3 and 4 over group 1 birds, which is in accordance with observations of previous authors [2, 4, 1, 13, 6, 5, 17, 7]. who were conducted PbAc and TMTD induced toxic studies in chickens. In toxic groups a decrease in body weights could be due to decrease in feed consumption or metabolic disturbance.

The lower body weights in PbAc treated birds (group 2) could be due to decreased feed consumption and also due to metabolic disorders associated with PbAc, such as inhibition of enzymes involved in the haeme synthesis and the oxidase system resulting in loss of cellular functions and tissue damage [4].

Lower body weights in TMTD treated group (group 3) birds were in agreement with [19, 8, 16, 14, 9, 10]. Reduced body weights in TMTD group birds might be due to TD, which affect the free movement of birds for feed and water intake. The TMTD may also interfere with liver function and antioxidant enzyme systems in liver [8, 20].

Significantly ($P<0.05$) reduced body weights were also observed in group 4 birds when compared to group 1 birds could be due to mixed toxicity of PbAc and TMTD in which the mean values were numerically less than the mean values of groups 2 and 3 birds.

Reference

1. Abdullah ST, Mustafa NG. Effects of lead acetate and probiotic on some physiological parameters in broiler chicks. Rafidain journal of science. 2009;20(2 E):1-7.
2. Bakalli RI, Pesti GM, Ragland WL. The magnitude of lead toxicity in broiler chickens. Veterinary and Human Toxicology. 1995;37(1):15-19.

3. Ercal N, Gurer-Orhan H, Aykin-Burns N. Toxic metals and oxidative stress part I: mechanisms involved in metal-induced oxidative damage. Current Topics in Medicinal Chemistry. 2001;1(6):529-539.
4. Erdogan Z, Erdogan S, Aksu T, Baytok E. The effects of dietary lead exposure and ascorbic acid on performance, lipid peroxidation status and biochemical parameters of broilers. Turkish Journal of Veterinary and Animal Sciences. 2005;29(4):1053-1059.
5. Hossain, MA, Akanda MA, Mostofa M, Awal MA. Ameliorative effects of dried garlic powder (*Allium sativum*) on hematological parameters against Lead (Pb) intoxication in broiler chickens. Pharmacologia. 2014;5:110-119.
6. Ibitoye EB, Olorede BR, Agaie BM, Ahmed A, Jimoh AA. Effects of dietary lead exposure and graded levels of ascorbic acid supplementation on performance and haematology of broiler chickens. Sokoto Journal of Veterinary Sciences. 2011;9(2):1-6.
7. Jaiswal R, Ali SL, Dinani OP, Jaiswal SK. Effect of Lead Toxicity In Broiler Chicken. Int. Arch. App. Sci. Technol. 2017;8(1):08-11.
8. Lakshman M. Effect of Tetramethyl thiuram disulfide on the growth rate and leg weakness in broilers. Indian Veterinary Journal. 2004;81(10): 1093-1096.
9. Mehmood K, Zhang H, Iqbal MK, Rehman MU, Li K, Huang S, Li J. Tetramethylpyrazine mitigates toxicity and liver oxidative stress in tibial dyschondroplasia chickens. Pakistan Veterinary Journal. 2018;38(1):76-80.
10. Nabi F, Zhang H, Iqbal MK, ur Rehman M, Shahzad M, Mehmood K, *et al*. Salvia Miltiorrhiza Reinstates Growth Plate Width, Reduces Liver Oxidative Stress and Toxicity in Avian Tibial Dyschondroplasia. Pakistan journal of zoology. 2018;50(4):1-4.
11. Nene YL, Thapliyal PN. Fungicides in plant disease control. 2nd ed. IBH Publishing Company, New Delhi, 1982, 70-89.
12. Osweiler GD. Lead toxicosis. Toxicology, ed. Osweiler GD, 1996, 191-197.
13. Rahman S, Joshi MV. Effect of lead toxicity on growth and performance of broilers. Tamil Nadu J. Vet. Anim. Sci. 2009;5:59-62.
14. Rath NC, Huff WE, Huff GR, Kannan L. Induction of tibial dyschondroplasia by carbamate and thiocarbamate pesticides. Avian Diseases. 2007;51(2):590-593.
15. Snedecor GW, Cochran WG. Statistical methods. Affiliated East. West Press, New Delhi, 13, 8th ed, 1994, 1467-1473.
16. Subapriya S, Vairamuthu S, Manohar BM, Balachandran C. Pathomorphological changes in thiram toxicosis in broiler chicken. International Journal of Poultry Science. 2007;6(4):251-254.
17. Suganya T, Senthilkumar S, Deepa K, Muralidharan J, Sasikumar P, Muthusamy N. Metal Toxicosis in Poultry - A Review. International Journal of Science, Environment and Technology. 2016;5(2)**:**515-524.
18. Tomlin C. The Pesticide Manual, British Crop Protection Council. Surrey, UK, 10th ed, 1994, 463-470.
19. Veltmann Jr JR, Linton SS. Influence of dietary tetramethylthiuram disulfide (a fungicide) on growth and incidence of tibial dyschondroplasia in single comb White Leghorn chicks. Poultry Science. 1986;65(6):1205-1207.
20. Zhang H, Mehmood K, Jiang X, Yao W, Iqbal M, Li K, *et al*. Effect of icariin on tibial dyschondroplasia incidence and tibial characteristics by regulating P2RX7 in chickens. BioMed Research International, 2018**,** 1-11.