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## Growth Performance Studies in Thiram Toxicosis in Broiler Chicken

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**Abstract:** Thiram a fungicide used for treating corn and storing food grains were incorporated at 15, 30 and 60 ppm into the toxin free diet of broiler chicken for four weeks from the day of hatch. Body weights (g) were recorded at weekly intervals. Average weekly feed consumption (g) and conversion were arrived at. The results showed that feeding thiram caused dose and time related severe depression in the body weight gain. Significant reduction in weight gain was observed from the first week in 60 ppm level and from second week in 30 ppm level. By fourth week all the thiram fed birds showed significant reduction in the weight gain.

**Key words:** Broiler chicken, feed consumption, feed conversion, thiram

### Introduction

Thiram, tetramethyl thiuram disulphide is a protective dithiocarbamate fungicide used as a foliar treatment on fruits, vegetables and ornamentals and as a seed treatment to control a number of fungal diseases (Tomlin, 1994). Commercial formulations of thiram include wettable powder, dustable powder, water dispersable powder for slurry treatment, suspension concentrates, water dispersable granules and flowable concentrates for seed treatment (Hayes and Laws, 1991). Treated grains occasionally find their way into market (Vargas *et al.*, 1983). Orth and Cook (1994) defined tibial dyschondroplasia as a disease found in fast growing strains of chickens, turkeys and ducks in which growth plate cartilage accumulated in the metaphyseal region of the tibiotarsus. The incidence of the lesion could be affected by a number of other factors including diet, surgical interference, environmental factors, selective breeding (Lawler *et al.*, 1988) and a mycotoxin produced by *Fusarium equiseti* (Walser *et al.*, 1982). Signs of tibial dyschondroplasia were apparent when the birds were fourteen days of age (Leach and Nesheim, 1965).

Perusal of literature showed that thiram caused reduction in body weight gain from 30 ppm onwards in broiler chicken when fed from hatch to 4 weeks. Hence the present effort was taken to study the effects of thiram at still lower dose levels of 15 ppm along with 30 and 60 ppm levels.

### Materials and Methods

The study was conducted at the Department of Veterinary Pathology, Madras Veterinary College, Chennai-600 007, India. Commercial day old broiler chicks (VENCOBB) were obtained from a commercial hatchery. Forty eight birds were randomly allotted to four groups of 12 each.

Experimental thiram toxicosis was induced by feeding diets containing 0, 15, 30 and 60 ppm thiram to the four

groups from hatch to 4 weeks of age. Body weights (g) were recorded at weekly intervals. Average weekly feed consumption (g) and conversion were arrived at.

### Results and Discussion

**Body weight:** Mean $\pm$ SE weekly body weights of broiler chicken fed thiram are shown in Table 1. The body weight gain is shown in Table 2.

Significant ( $p<0.05$ ) difference in body weights was observed between the control and 60 ppm thiram fed group from the first week and the 30 ppm group differed significantly ( $p<0.05$ ) from the second week than the control. Highly significant ( $p<0.01$ ) differences were observed between the control and 30, 60 ppm thiram fed groups in the third week while the 15 ppm thiram group revealed no significant difference when compared to that of control in the third week. Significant ( $p<0.05$ ) difference was observed between the control and 15 ppm and highly significant ( $p<0.01$ ) differences were observed between the control and 30 and 60 ppm thiram groups in the fourth week.

Significant ( $p<0.01$ ) reduction in weight gain was observed from the first week in 60 ppm level and from second week in 30 ppm level. By fourth week all the thiram fed birds showed significant reduction in the weight gain. The 15 ppm group gained 6%, 10%, 11% and 12% less weight gain than the control in the first, second, third and fourth week. The 30 ppm group gained 13%, 22%, 17% and 24% less weight gain than the control in the first, second, third and fourth week. The 60 ppm thiram fed birds showed 14%, 25%, 30% and 26% less weight gain than the control in the first, second, third and fourth week. Though they tried to compensate the reduced weight gain in the fourth week the overall weight gain in the fourth week was lesser than the control.

Thus at the end of the trial, the 15 ppm group gained 12% less weight, the 30 ppm group 24% and the 60 ppm group 26% than the control group.

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Table 1: Mean ( $\pm$ SE) weekly body weight (g) of thiram fed broiler chicken

Thiram (ppm)	Hatch weight (n=12)	Weeks							
		1		2		3		4	
		BW (n=12)	RBW	BW (n=12)	RBW	BW (n=6)	RBW	BW (n=6)	RBW
0	49.33 $\pm$ 0.97	121.66 $\pm$ 3.55	100	305 <sup>a</sup> $\pm$ 8.81	100	583.30 $\pm$ 17.04	100	895.83 $\pm$ 21.44	100
15	50 $\pm$ 0.97	114.16 $\pm$ 3.10	94	274.58 $\pm$ 9.34	90	519.16 $\pm$ 29.03	89	788.33 $\pm$ 26.07	88
30	49.33 $\pm$ 0.73	109.16 $\pm$ 4.11	87	238.33 $\pm$ 9.35	78	483.33 $\pm$ 15.72	83	679.16 $\pm$ 15.72	76
60	49.16 $\pm$ 1.09	104.58 $\pm$ 4.10	86	230 <sup>b</sup> $\pm$ 11.56	75	409.16 $\pm$ 15.17	70	659.16 $\pm$ 24.54	74

Means with same superscripts within a column do not differ from each other ( $p > 0.01$ ), BW-Body weight RBW-Relative body weight

Table 2: Mean ( $\pm$ SE) body weight gain (g) of thiram fed broiler chicken

Thiram (ppm)	Hatch weight (n=12)	Weeks				Mean body weight gain	Relative body weight gain
		1 (n=12)	2 (n=12)	3 (n=6)	4 (n=6)		
0	49.33 $\pm$ 0.97	72.33 $\pm$ 4.06	183.33 $\pm$ 9.12	315.83 $\pm$ 38.12	312.50 $\pm$ 15.81	863.99 <sup>a</sup>	100
15	50 $\pm$ 0.97	63.66 $\pm$ 2.94	160.41 $\pm$ 10.2	200.83 $\pm$ 30.19	250.83 $\pm$ 43.46	727.39 <sup>b</sup>	76
30	49.33 $\pm$ 0.73	59.83 $\pm$ 3.80	149.58 $\pm$ 11.07	228.33 $\pm$ 20.48	195.83 $\pm$ 19.27	633.57 <sup>b</sup>	73
60	49.16 $\pm$ 1.09	55.41 $\pm$ 4.19	133.75 $\pm$ 15.14	165.00 $\pm$ 17.58	250.83 $\pm$ 26.65	604.16 <sup>b</sup>	70

Means with same superscripts within a column do not differ from each other ( $p > 0.01$ )

Table 3: Mean weekly feed consumption (g) of thiram fed broiler chicken

Thiram (ppm)	Weeks				Overall mean
	1 (n=12)	2 (n=12)	3 (n=6)	4 (n=6)	
0	88	173	403	612	1276
15	83	170	385	610	1248
30	85	166	374	597	1222
60	84	168	382	601	1235

Table 4: Mean feed conversion (feed/ gain) of thiram fed broiler chicken

Thiram (ppm)	Weeks				Overall mean
	1 (n=12)	2 (n=12)	3 (n=6)	4 (n=6)	
0	1.22	0.94	1.45	1.96	1.39
15	1.30	1.06	1.57	2.27	1.55
30	1.58	1.32	2.08	1.98	1.74
60	1.43	1.30	1.55	3.06	1.83

This reduction in the body weight gain were observed earlier by feeding 37.5-60 ppm thiram (Waibel *et al.*, 1957), 60 ppm (Veltmann *et al.*, 1985) in broiler chicken whereas Lakshman *et al.* (2002) reported no reduction in weight gain of broiler chicken fed 30 ppm thiram from the day of hatch to 56 days.

The study showed that feeding thiram caused dose and time related severe depression in the body weight gain. The decreased body weight gain could be attributed to interference to the digestive, absorptive and metabolic processes as the crop, proventriculus, gizzard, intestine, liver and pancreas were affected in the study which was also observed in histopathological examination.

**Feed consumption and conversion:** Mean $\pm$ SE weekly feed consumption and conversion of broiler chicken fed thiram are presented in Table 3 and 4 respectively. Total

feed consumption and conversion of broiler chicken fed 0, 15, 30 and 60 ppm of thiram were 1276, 1248, 1222 and 1235 g and 1.39, 1.55, 1.74 and 1.83 respectively. The study revealed that feeding thiram at 15, 30 and 60 ppm caused no significant reduction in feed consumption and feed conversion in the thiram treated birds.

Though there was an increased feed conversion ratio found in all toxin treated groups when compared to the control the differences were not statistically significant. Higher feed conversion ratio in the thiram fed birds ascribed to the increased feed intake and corresponding reduced weight gain in thiram fed birds. This indicated that the birds consumed more to gain less weight gain and thereby had poor feed conversion.

The findings testified the effect of feeding lower levels of thiram to broiler chicken affecting their growth performance. Hence further studies are required to arrive at still a lower level of thiram that would have no observable effect in broiler chicken. The feeds and feedstuffs meant for poultry should be screened for the presence of thiram.

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