Clinicopathological Investigation on 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. The clinical signs of tibial dyschondroplasia like reduced weight gain, lameness, abnormal bending of the tibial bones, enlarged hock joints and sternal recumbency were observed. The birds were sacrificed at the end of second and fourth week. Blood samples were collected for estimation of hematological parameters and sera separated for biochemical analysis. The packed cell volume and hemoglobin values were unaltered. Serum total proteins, albumin, globulin, albumin:globulin ratio, aspartate amino transferase, alanine amino transferase, alkaline phosphatase, gamma glutamyl transferase were unaltered. Hypercholesterolemia was observed in all the thiram fed birds and hypocalcemia and hypophosphatemia in the 60 ppm thiram fed birds.

Key words: Broiler chicken, tibial dyschondroplasia, hematology, serum biochemistry, thiram

Introduction
Pesticide is any substance or a mixture of substances intended for preventing, destroying, repelling or mitigating any pest (Helferich and Winter, 2001). It is a generic name for a variety of agents encompassing insecticides, herbicides, fungicides, acaricides, larvacides, miticides, mollusicides, pediculicides, rodenticides, scabicides, defoliants, desiccants, plant growth regulators and repellants. The efficacy of pesticides in controlling a wide range of pests has been established beyond doubt, providing us with abundant, inexpensive and attractive fruits and vegetables. But the widespread use and misuse of pesticides in feed and grain crop, cultivation and preservation makes it almost inevitable that certain of these products find their way into the feeding channels (Vargas et al., 1983). One such compound is thiram which causes tibial dyschondroplasia in birds.

Avian tibial dyschondroplasia is reported in thiram toxicity in meat strain birds such as chickens, ducks and turkeys in which the delicate balance between the extracellular matrix deposition and resorption has been upset in the growth plate of the tibiotarsus and other fast growing bones. It is characterized by an abnormal mass of cartilage, representing persistent prehypertrophic cartilage that has not been calcified and has not been invaded by blood vessels from the metaphysis (Leach and Nesheim, 1965). 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).

Rath et al. (1994) reported no effect of thiram toxicosis on calcium and phosphorus values in turkeys. Although the tibial dyschondroplastic condition due to thiram toxicity in broiler chicken has been studied in the past, literature on the serum biochemical alterations are very meagre. Hence the present work was undertaken to study in detail the hematological and biochemical alterations.

Materials and Methods
Forty eight newly hatched unsexed broiler chicks were obtained, wingbanded, weighed and housed in battery brooders with ad libitum supply of feed and water. They were randomly distributed into four groups of twelve chicks each. The control and toxin mixed diets were fed to the different groups at the concentration of 0, 15, 30 and 60 ppm thiram for 28 days from the day of hatch. The birds were sacrificed at second and fourth week. Blood samples were collected by intra cardiac puncture (Vargas et al., 1983). One such compound is thiram which causes tibial dyschondroplasia in birds.

The serum total protein and albumin were estimated by modified Biuret and Dumas method, glucose by glucose oxidase method (GOD), cholesterol by CHOD/POD (Cholesterol dehydrogenase/peroxidase) method, aspartate amino transferase (AST), alanine amino transferase (ALT), Gamma Glutamate Transferase (GGT) and alkaline phosphatase (ALP) by IFCC (International Federation of Clinical Chemistry) method, phosphorus by modified Metol method, calcium by OCPC (o-cresolphthalein complexone) method and magnesium by Calmagite method by using commercial reagent kits in semi auto analyzer (Biosystem, 320).
Serum Enzymes

Aspartate amino transferase: The respective overall mean±SE for 0, 15, 30 and 60 ppm thiram were 21.12±1.29, 21.44±2.31, 22.21±2.90 and 20.02±2.92 U/L. Comparison of means revealed no significant differences between the control and thiram treated groups.

Alanine amino transferase: The respective overall mean±SE for 0, 15, 30 and 60 ppm thiram were 12.31±2.01, 12.44±1.93, 13.38±2.72 and 13.30±2.16 U/L. Comparison of means revealed no significant difference between the control and thiram treated groups.

Acknowledgements

The authors thank the Dean, Madras Veterinary College for the facilities provided.
Subapriya et al.: Clinicopathological Investigation on Thiram Toxicosis

References