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# Effect of Carbaryl Supplemented Feed on Biochemistry in Broiler Chicks

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**Abstract :** This study investigated carbaryl impact on blood serum cholesterol and creatinine on broiler chicks. Broiler chicks were used in the study and the animals were divided in four groups: one control and three experimental groups. Carbaryl was added into diet of experimental broiler chicks at three different doses, low (15mg/kgb.w.), intermediate (20mg/kgb.w.), and high dose (25mg/kgb.w.) for 21 days. Blood from wing vein was analyzed for serum cholesterol, and creatinine. Cholesterol level was increased insignificantly ($p>0.005$) in low dose and high dose but was similar to control in intermediate dose. Creatinine level was (non significant at $p>0.005$) increased in low, intermediate and in high doses.

**Key words :** Carbaryl supplementation, Broiler chicks, Biochemistry

## Introduction

Carbaryl is a popular insecticide that has been used since 1956. It is broad spectrum insecticide, killing most insects, and is also used as a molluscide to kill slugs and snails. It is the oldest commercially viable insecticide in the carbamate chemical family (Ware, 2000).The U.S. Environmental Protection Agency estimates that about two million pounds of carbaryl are used every year for agricultural purposes. Use in yards and gardens is at least as much, and perhaps significantly more; EPA's estimates range from two to four million pounds per year (Kiely *et al*., 2004).

In humans they affect the interactions between nerves and muscles. Symptoms of poisoning in people exposed to carbaryl included irritated, swollen, congested, stinging or burning eyes as well as sore or burning throat, chest tightness, wheezing, sweating, nausea and vomiting, according to reports collected by the California Environmental Protection Agency (Calif. EPA. 2005).

The National Institute for Occupational Safety and Health labels carbaryl as a mutagen and has identified over 20 studies conducted in the 1970s and 1980s documenting carbaryl's ability to cause genetic damage (National Institute for Occupational Safety and Health. 2004).

Birds exposed to carbaryl for an extended period of time may produce fewer eggs have a higher number of cracked eggs, and are less fertile (U.S.EPA. 2003).

## Materials and Methods

**Experimental Animals:** Twenty day-old broiler chicks (*Gallus gallus*) of weight ranging from 25-30 gm. were used in the experiment. Broiler Chicks were quarantified for 10 days and it was confirmed that they were free of pathogen and any other disease.

Broiler Chicks were kept in conventional condition (open system) and housed in stainless steel cages (800×14cm2) in animal house with room temperature 22±3°C , relative humidity 50-70%, photo period of 12 hrs. Light and 12 hrs. Dark. They were provided with commercial broiler chick starter diet and water ad libitum.

**Experimental Procedure:** The Chicks were distributed into four groups: one control group and three treated groups i.e. Low, Intermediate, and High dose. Chicks were distributed so as the average body weight of each group remains approximately same. Control group was fed on the basal diet (commercial broiler chick starter diet) while all treated groups was supplemented with 15mg/kg b.w., 20mg/kg b.w. and 25mg/kg b.w. of carbaryl for 21 days.

**Biochemical Analysis:** The cardiovascular blood was taken for biochemical analysis. The blood was allowed to clot and was subjected to centrifugation at 2500rpm for twenty minutes. The serum obtained was analyzed in BECKMANN Synchron Clinical System CX4/ CX5, USA, for the following parameters by using different kits in various wavelengths.

**Cholesterol:** Serum cholesterol concentration was determined as mg/dl by using PAP SL MONO Kits at

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505nm wavelength.

**Creatinine:** Serum creatinine concentration was determined as mg/dl by using Infinite Liquid CK-NAC reagent Kits at 340nm wavelength.

## Statistical Analysis

Statistical analyses were performed using STATGRAPHICS 3.0 software. The data were analyzed using one-way ANOVA test. Results were presented as mean±SE. The significance of difference among the groups was assessed using students t-test. Significance was set as $P<0.05$, $P<0.01$ and $P<0.001$.

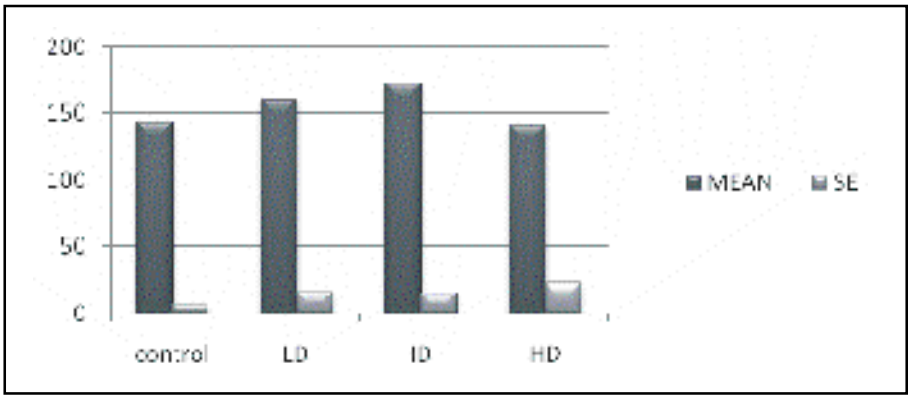
## Result

In Table-1, Graph-1(a) shows statistically insignificant $p>0.005$ and pronounce increase was found in cholesterol level of low dose and intermediate dose treated groups but mild decrease was found in high dose treated group as compared to control.

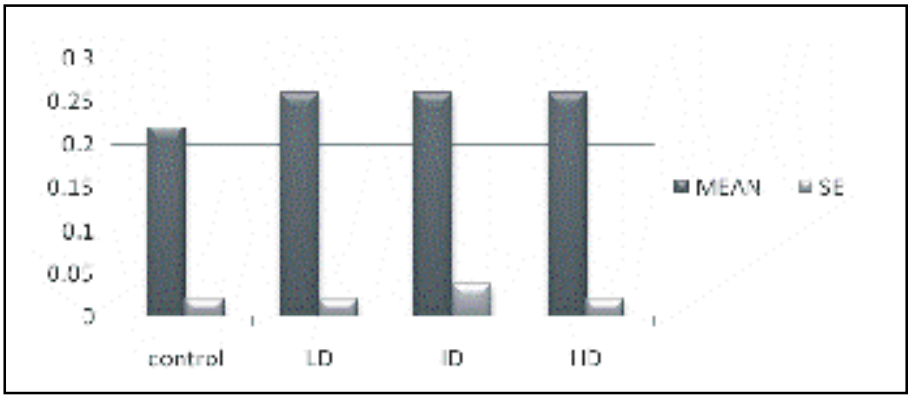
**Table 1: Biochemical changes (Mean±S.E.) in broiler chicks exposed to different doses of Carbaryl (n=5)**

| Parameters | Control | Low dose | Intermediate dose | High dose |
|---|---|---|---|---|
| **Cholesterol (mg/dl)** | 142.6±6.43 | 160.4±16.13 | 172.2±15.37 | 141.4±22.76 |
| **Creatinine (mg/dl)** | 0.22±0.02 | 0.26±0.02 | 0.26±0.04 | 0.26±0.02 |

*Values are mean of experiments ± SEM with 5 chicks in each group. Those marked with asterisks differ significantly from the control values *P<0.05, **P<0.01, ***P<0.001 (by ANOVA test).*




**Graph 1(a): Effect of carbaryl on cholesterol in broiler chicks**




**Graph 1(b): Effect of carbaryl on Creatinine in broiler chicks**

In Table-1, Graph-1(b) creatinine level was observed non significant p>0.005 increase in low dose, intermediate dose and in high dose treated groups as compared to their respective control groups and were similar in all the treated groups.

## Discussion

The pesticides tend to become concentrated as they move up the food chain they accumulate in organism body (target and non-target organism) which contents them. The pesticides don't kill the individual birds often but do affect their bodies so that they lay eggs with very thin shells often these thin-shelled eggs break or the birds are unable to reproduce and pesticides also affect birds' physiological functions.

There was a statistically insignificant increase was found in cholesterol level of carbaryl treated low dose and intermediate dose group. Creatinine level was increased in all the treated groups. Contrary to this Coles (1986) observed increased serum cholesterol level in broiler chicks fed Thiram. At all the dose levels, fluvalinate exerted some hyperglycemic effect. Increase in blood glucose, lactate and plasma adrenaline and noradrenaline in rats following intoxication by synthetic pyrethroids has been documented (Bradbury and Coats, 1989).

Nicolaus and Lee (1999) observed the effect of organophosphate and carbamates on black bird in filed conditions, they also reported inhibition in cholinesterase activity. Mineau (1993) and Burgees *et al.,* (1999) determined the effect of organophosphate and carbamate on birds population they kill birds in a large number. Exposure to thiram caused time and dose dependent morphological and biochemical changes in testes (Mishra *et al.,* 1998). Serum cholesterol and testicular free sialic acid were increased and testicular protein decreased in the treated rats. Suppression of cell mediated immune response has been reported in lambs fed carbofuran, for six months.

In rats fed with carbaryl Hepatotoxicity can be estimated by leakage of cytoplasmic enzymes such as glutamic-oxaloacetic transaminase (SGOT) and glutamic-pyruvate transaminase (SGPT) into the serum.

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