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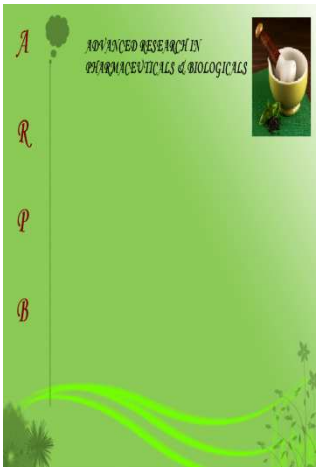

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EFFECT OF CARBARYL ON ORGAN WEIGHT OF BROILER CHICKS

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ABSTRACT:

Carbaryl is an N-methyl carbamate insecticide which is effective against many pests, and is used on a wide variety of crops, poultry, domestic animals, and household and garden pests. The toxic action of carbaryl is due to its ability to inhibit cholinesterase. This study was taken to investigate impact of carbaryl on absolute and relative organ weight of 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/kg B.W.), intermediate (20mg/kg B.W.), high (25mg/kg B.W.) and control for 21 days. At the end of the experiment non significant ($p>0.005$) and dose dependent elevation was observed in absolute liver weight, heart weight and lung weight as compared to their respective control groups. Statistically significant $p<0.005$ increase in relative liver weight was found but statistically insignificant increase was found in relative heart and lung weights.

Keywords: Carbaryl, Pests, Broiler chicks and Organ weights, Insecticide.

INTRODUCTION

In the thirst of modernization and industrialization man has contributed pollution to the life and ecology of plants, animals and microbes. Increased demand for food and fiber has lead to the chemicalization of agriculture and we have reached on such a stage that modern agriculture is dependent on high yielding varieties, which can only be grown under the influence of fertilizers and pesticides. About 5 million tons of pesticides are applied annually in the World, of which about 70% is used for agriculture and the remainder by public health and Government agencies for vector control and by some owners[1]. Avian species have a unique place in ecosystem. They constitute one of the diverse and evolutionary successful groups and occur in large number in the tropics. The threats leading to their population decline are many and varied, but agriculture alone affects 87% of the globally threatened bird species[2]. Dietary exposure to pesticides has been demonstrated to reduce food consumption, body weight, egg production, fertility, and hatchability in the chicken (*Gallus domesticus*), partridge (*Alectoris graecd*), pheasant (*Phasianus colchicus*), and quail (*Colinus virginianus* and *Coturnix coturnix japónica*) in a dose-dependent manner[3].

Pesticides induced death in birds is difficult to estimate accurately. Birds may die away from the site of poisoning or their carcasses decompose quickly or may be eaten by the scavengers. As a result, a small portion of such deaths are documented. In the USA, one in three bird species is either endangered or threatened or in need of conservation[4]. The risk to non-target animals is enhanced, when the top level consumers consume contaminated food. Pesticide level in human adipose tissue and breast milk is noteworthy[5].

The present work focused on the effect of carbaryl on the organ weights of broiler chicks. To understand the toxic effects and mechanisms of action of pesticide is quite essential to assess the public and environmental health risks[5].

MATERIALS AND METHOD

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 stainless steel cages 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. 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. At the end of the experiment the liver, heart and lung of broiler chick were selected for further analysis. Organs after being removed from broiler chick was rinsed in saline solution for 2-3 times to remove any blood debris attached on the external surface.

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± SEM.

The significance of difference among the groups was assessed using students t-test. Significance was set as $P<0.05$, $P<0.01$ and $P<0.001$.

RESULTS

Absolute organ body weight of carbaryl treated broiler chicks: In the present study Table -1, Graph-1(a) absolute liver weight observed non significant ($p>0.005$) and dose dependent elevation compared to their respective control groups.

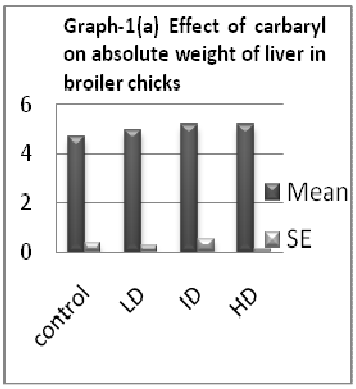
On comparing with control, the absolute organ body weight of heart shows mild elevation in low dose, intermediate dose and in high dose. It was statistically insignificant at $p>0.005$ Table -1, Graph-1(b).

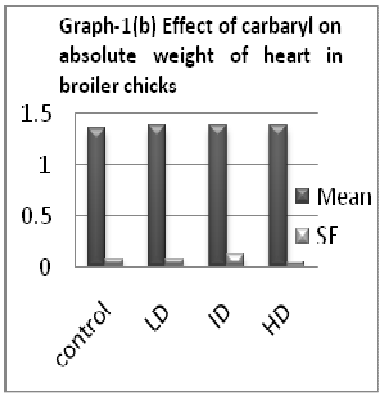
In the present study, Table-1, Graph-1(c) show non significant $p>0.005$ and dose dependent elevation in the absolute weight of lung compared to their respective controls.

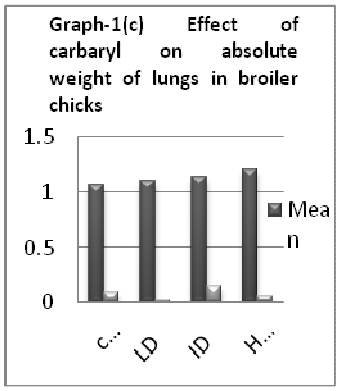
Table-1: Absolute organ weight (Mean ± SEM) in broiler chicks exposed to different doses of carbaryl (n=5)

Parameters	Control	Low dose	Intermediate dose	High dose
Liver	4.66±0.34	4.91±0.21	5. 17±0.49	5.15±0.13
Heart	1.35±0.08	1.39±0.08	1.38±0.12	1.38±0.05
Lungs	1.06±0.09	1.1±0.02	1.13±0.15	1.2±0.06

Values are mean of three 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).







Relative Organ Body Weight of Carbaryl Treated Broiler Chicks: In Table-2, Graph-2(a) shows statistically significant $p<0.005$ increase in relative liver weight of intermediate dose and high dose than low dose but insignificant increase was found in low dose as compared to control. On comparing with control, the relative organ body weight of heart shows statistically insignificant ($p>0.005$) mild elevation in low dose and intermediate dose but slight depression was found in high dose Table-2, Graph-2(b).

In the present study, Table-2, Graph-2 (c) shows statistically insignificant $p>0.005$ and dose dependent elevation in low dose, intermediate dose and in high dose in the relative weight of lung compared to their respective controls.

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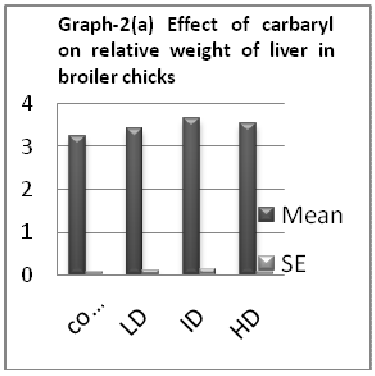
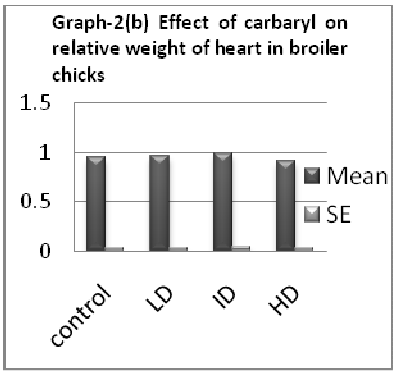
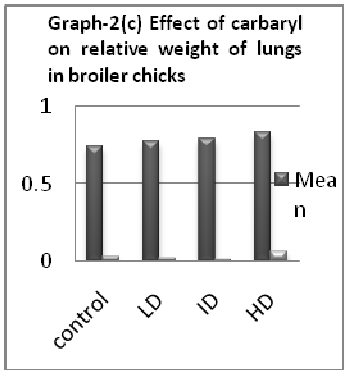
Table-2: Relative organ weight (Mean±SEM) in broiler chicks exposed to different doses of carbaryl (n=5)

Parameters	Control	Low dose	Intermediate dose	High dose
Liver	3.25±0.07	3.42±0.11	3.67±0.13*****	3.55±0.06*****
Heart	0.95±0.03	0.97±0.03	0.99±0.04	0.92±0.03
Lungs	0.74±0.03	0.77±0.02	0.79±0.01	0.83±0.06

Values are mean of three 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).







DISCUSSION

Broiler chicks fed with carbaryl shows insignificant and dose dependent increase in the absolute weight of liver in all the treated groups. Insignificant slight increase was found in the absolute weight of the lungs of broiler chicks fed carbaryl. Insignificant slight increase was found in the absolute weight of the heart of broiler chicks fed carbaryl. Contrary to our result in broiler chicks the weights of liver and kidney, expressed as a percentage of body weights were lower in pigs fed diets containing grains naturally contaminated with Fusarium mycotoxins in those fed the control diet[6]. Some workers reported absolute weight of liver was not affected by various doses by Salinomycin as compared to control birds[7]. The absolute weight of kidneys significantly decreased by various doses of Salinomycin. The weight of spleen was depressed in chicks fed with hexabromobiphenyl[8]. Significant reduction was reported in both the absolute and relative weights of liver and kidney in starter pigs fed with deoxynivalenol from contaminated wheat[9].

Broiler chicks fed with carbaryl shows insignificant increase in the relative weight of heart in all the treated groups. Chicks fed with carbaryl shows significant increase in the relative weight of liver in intermediate and high dose groups. Contrary to our result[10,11,12] reported no effect on the relative weight of liver and gallbladder in broiler chicks fed organic acids. There was an insignificant, dose dependent increase was found in the lungs of broiler chicks in all the treated groups fed carbaryl.

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