Body weight changes in broiler chicks fed different levels of zinc

Publication History
Received: 14 September 2016
Accepted: 08 October 2016
Published: 16 October 2016

Citation
Sabina Khanam. Body weight changes in broiler chicks fed different levels of zinc. Indian Journal of Science, 2016, 23(86), 791-797

Publication License
This work is licensed under a Creative Commons Attribution 4.0 International License.

General Note
Article is recommended to print as digital color version in recycled paper.
BODY WEIGHT CHANGES IN BROILER CHICKS FED DIFFERENT LEVELS OF ZINC

Sabina Khanam
Yobe State University, Nigeria
Email:sabinakhanam@ymail.com

Abstract
Zinc is one of the most abundant trace element in the earth crust. It is found in almost all foods but poultry, fish and meat are major source of zinc. Its primarily function is it acts as a catalyst in various enzyme systems. Humans expose to zinc via contaminated air, water and soil and by drinking beverages that has been stored in metal container. Twenty day old broiler chicks were used in the experiment of weight ranging from 25-30 gm. Chicks were distributed into four groups one control group and three treated groups. Treated groups were supplemented with 300mg/kgb.w (Low dose, LD), 600mg/kgb.w (Intermediate dose, ID), and 900mg/kgb.w. (High dose, HD) of Zinc for 21 days. Body weight of chicks was measured at day 0, 7, 14, and 21. Statistically insignificant \( p > 0.005 \) increases in the body weight of the broiler chicks were recorded with different doses of zinc as compared to control.

Key words: broiler chicks, zinc, body weight

INTRODUCTION
Zinc is one of the most common trace element in the earth crust. It is second most abundant trace element in the earth crust (King and Cousins, 2006). Zinc is a trace element which is essential for growth of broiler chicks and also involved in various physiological, digestive and biosynthetic processes in the body of broiler chicks as well as in humans. Its primarily function is it acts as a catalyst in various enzyme systems within cells or as parts of enzymes. Zinc also involved in hormone secretion pathways and in immune defence systems. It is believed that zinc is essential for immunity and functions of various enzymes (Chandra and Dayton, 1982; Sherman, 1992). In birds zinc is supplemented in the form of inorganic salts like sulphates, oxides and bicarbonate to allow birds to reach its genetic growth potential. Meat, fish and poultry are the major sources of dietary zinc.
Zinc is found in air, soil and water, and in almost all foods. It released into the environment by some human activities like mining, coal burning, and burning of waste. We can expose to zinc by food, water and by drinking contaminated water and beverages that has been stored in metal container which is made up of zinc.

Zinc has been used as growth stimulator of farm animals. It is also functions as activator of various enzymes and hormones. Diets low in zinc content lead to reduced weight gain and depressed appetite (Miller et al., 1968; Swinkels et al., 1994). Zinc supplementation improves the body weight gain performance in dairy cattle and poultry (Feng et al., 2010). Several organic acids such as lactic acid, acetic acid, fumaric acid and malic acid have been used as growth promoters in chickens. Primarily it is important for young poultry because in which endogenous acid production is low (Golden, 1988; Biggs and Parsons, 2008).

The objective of this research is to study the alteration in body weight gain by zinc supplementation in broiler chicks.

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 perchased from Gajaria farm, Lucknow.

EXPERIMENTAL LAB: The experiment was conducted in the Laboratory of Reproductive Biology, D.G. College, Kanpur and Animal House of Central Drug Research Institute (CDRI), Lucknow.

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 i.e. Low dose, Intermediate dose, High dose and Control group in the experiment. Chicks were distributed so as the average body weight of each group remains approximately same.
This experiment was conducted to determine the toxic effects of Zinc on body weight of broiler chicks of various levels of Zinc added to the diet of chicks. Control group was fed on the basal diet (commercial broiler chick starter diet) while all treated groups was supplemented with 300mg/kgb.w (Low dose, LD), 600mg/kgb.w (Intermediate dose, ID), and 900mg/kgb.w. (High dose, HD) of Zinc for 21 days.

**BODY WEIGHT:** Body weight of chicks was measured at day 0, 7, 14, and 21.

**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 AND DISCUSSION**

The present study shows statistically insignificant p>0.005 increases in the body weight of the low dose, intermediate dose and high dose of experimental animals were recorded as compared to control with different doses of zinc(Table-1, Graph-1). Moreover, they were similar during all stages of the experiments. Contrary to our result Mohanna and Nys (1999) reported increased body weight gain and feed intake in responses to higher zinc concentrations. The clinical symptoms observed in the study in all the treated groups were sudden onset of depression, reduced feed intake, dullness, and ruffled feathers and control group did not show any visible clinical signs.

Some of the researchers observed no differences in body weight and feed conversion of broiler chicks supplemented with zinc in diet (Kidd et al., 1992, 1994). When diets low in zinc content resulting in lowered feed intake  and reduced weight gain (Miller et al., 1968; Swinkels et al., 1994).

<table>
<thead>
<tr>
<th>Group</th>
<th>0 day</th>
<th>7 day</th>
<th>14 day</th>
<th>21 day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>207.74±19.6 8</td>
<td>300.3±21.16</td>
<td>353.4±15.86</td>
<td>489.48±38.7 9</td>
</tr>
<tr>
<td></td>
<td>Low dose</td>
<td>Intermediate dose</td>
<td>High dose</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>---------------</td>
<td>-------------------</td>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>202.22±15.3</td>
<td>248.28±11.3</td>
<td>215.58±26.5</td>
<td></td>
</tr>
<tr>
<td>Days</td>
<td>8</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>279.44±19.3</td>
<td>332.6±15.79</td>
<td>308.72±47.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>308.6±30.52</td>
<td>400.72±14.4</td>
<td>365.64±59.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>444.12±28.8</td>
<td>444.74±25.5</td>
<td>448.76±61.8</td>
<td></td>
</tr>
<tr>
<td>Days</td>
<td>9</td>
<td>4</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

Table-1: Body weight changes (Mean±S.E.) in broiler chicks exposed to different doses of Zinc (n=5)

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).

Graph-1: Effect of zinc on body weight of broiler chicks
REFERENCES


