EVALUATION OF DIFFERENT SOURCES OF DIETARY ZINC SUPPLEMENTATION FOR JAPANESE QUAIL: 2 - LAYING PERFORMANCE

By

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Received: 08/09/2008    Accepted: 20/02/2009

ABSTRACT: The present investigation was performed at the Poultry Research Station, El-Azab, Fayoum, Egypt. The aim of the present investigation was to evaluate the advantage and profound impacts of inclusion different sources of dietary Zn (Zn SO4, imported zinc-methionine and local zinc-methionine) on productive performance and economical efficiency of laying Japanese quails. These different commercial sources of dietary Zn were added over the basal diets (the control diets containing 50 mg Zn/kg diet) of the birds at the level of 50 mg Zn/kg diet. A total number of six hundred and sixty six unsexed one-week old Japanese quail chicks were used. The chicks were randomly distributed equally into six dietary treatments, and each dietary treatment was subdivided equally into three replicates. Chicks were housed in battery brooders and raised under similar environmental, managerial and veterinarian conditions. After that the layers (from the same flock) were reared in quail community batteries also, under similar management, hygienic and environmental conditions. The six experimental dietary treatments (T) and diets (D) were as follow: 1- T1: the basal diet (the control diet, C), without any additives, but contained 50 mg Zn/kg diet through general premix used for all chicks. 2- T2: C + 50 mg Zn (from Zn SO4)/kg diet. 3- T3: C + 50 mg Zn (from Zn SO4)/kg diet + 200 mg methionine/kg diet. 4- T4: C + 50 mg Zn (from imported zinc methionine)/kg diet. 5- T5: C + 50 mg Zn (from local zinc methionine)/kg diet. 6- T6: C + 200 mg methionine/kg diet. Results obtained showed the following: 1- There was no positive response for Zn or methionine supplementation at levels 50 mg Zn or 200 mg methionine/kg diet on egg number, egg production % and egg mass of laying Japanese quails. 2- Layers of Japanese quail fed diet supplemented with 50 mg Zn (from local Zn-
methionine), recorded the least FI, and also, realized the best FC values, followed by those fed diet supplemented with 50 mg Zn (from ZnSO₄). 3- Layers of Japanese quail used up diet supplemented with 50 mg Zn (from imported Zn-methionine) gave the best fertility%. 4- Egg weight, yolk index and egg shape index of laying Japanese quails were not significantly affected by the different diets supplemented with 50 mg zinc or 200 mg methionine. 5- Layers of Japanese quail consumed diet supplemented with 50 mg Zn (from local Zn-methionine) exhibited the least feed cost/egg and realized the best economical efficiency value, followed with those fed diet supplemented with 50 mg Zn (from ZnSO₄), which provided better economical efficiency than the other experimental groups.

It is concluded that increasing Zn over NRC (1994) recommendation (50 mg /kg diet) for laying Japanese quail hens had no significant impact on egg production, egg weight, feed conversion or economical efficiency. However, Zn supplementation as Zn-methionine at a level higher than that of NRC (1994) recommendation improved fertility %. Inclusion of 50 mg Zn over NRC, 1994 recommendation or 200 mg methionine hydroxyl analogue free acid (88%) to the diets of Japanese quail layers insignificantly, ameliorated both egg weight and yolk weight % values, but did not improve both albumen weight%, yolk color and egg shell quality (egg shell weight and egg shell thickness).

**INTRODUCTION**

Zinc is the most common metal constituent of cellular enzymes and as such plays essential roles in cell proliferation and death, immune development and response, reproduction, gene regulation, and defense against oxidative stress and damage. Likely reflecting its role in gene regulation, zinc is required for the synthesis of two key structural proteins: keratin (the major structural protein of feathers, skin, beaks and claws) and collagen (the major structural protein of the extracellular matrix and connective tissues), (Richards and Dibner, 2005). Fundamentally, some multi functional affects of Zn could be denoted as follow: 1- Induction of metallothionein, modulation of the transition elements and its relationship with the antioxidant vitamins such as vitamin A and E (Salgueri et al., 2000), 2- Zinc induces the production of metallothionein, an effective scavenger of hydroxyl radicals, therefore Zn- metallothionein complexes in the islet cells may provide protection against immune-mediated free radical attack (Shaheen and Abd El-Fattah, 1995), 3- Zinc has a capacity to
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displace transition metals (Fe, Cu) from binding sites. It can compete with iron and copper to bind to cell membrane and decrease the production of free radicals, thus exerting a direct antioxidant action (Tate et al., 1999). 4- Zinc is a cofactor of the main antioxidative enzyme Cu Zn-superoxide dismutase, it may play a key role in suppressing free radicals and inhibiting NADPH-dependent lipid peroxidation (Prasad, 1997) as well as in preventing lipid peroxidation via inhibition of glutathione depletion (Gibbs et al., 1985). Ultimately, Poultry diets are often supplemented with Zn above the amount recommended by the National Research Council, in order to assure optimal performance (NRC, 1984). Evidently, the great affect of Zn could be in respect that, zinc has numerous roles in some biological functions as well as protein metabolism (Forbes, 1984), DNA synthesis (Lieberman et al., 1963), cell division and multiplication (Rubin and Koide, 1973) and the cell mediated immune response (Luecke et al., 1978) and overall performance (Collins and Moran, 1999 and Mohanna et al., 1999). Poultry diets are often supplemented with Zn above the amount recommended by the National Research Council, in order to assure optimal performance (NRC, 1984). A number of compounds have been used as a source of zinc in poultry nutrition. Those commonly used as feed grade are zinc sulphate(22.7 % Zn) and zinc oxide(80.3 % Zn). Among various zinc compounds zinc in zinc sulphate is considered to be completely available to the chick. Fundamentally, zinc-methionine complex (commercially produced) consists of zinc sulphate (ZnSO4) and DL-methionine to yield a 1:1:1 ratio of zinc:methionine:sulfate. Zinc is coordinated between the amino and carboxyl groups of methionine, and sulfate occupies the valent bonds. Another type of zinc and methionine combination occurs between the metal and methionine hydroxy analogue –free acid where one atom of zinc is chelated by two molecules from the analogue (1:2). Thus, zinc-methionine is an organic source for Zn because of methionine, whereas ZnO and ZnSO4 are inorganic sources (Kidd et al., 1994). Differences could be found between organic and inorganic sources of zinc in availability and effectiveness on poultry performance. In this respect, Kout El-Kloub et al., (2004) concluded that zinc-methionine at levels of 100 and 150 mg/kg and ZnO at level of 100 mg/kg as feed additives in Silver Montazah laying hens diets obtained better productive and reproductive performance. In this concern, Flinchum, (1990) found that, zinc-methionine has improved performance of laying hens and also, it ameliorated turkey performance (Waibel et al., 1974). Furthermore, Kidd et al., (1996) suggested
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that, zinc-methionine may improve the immune system and augment disease resistance when added to the diet of poultry or when passed from dam to chick.

The aim of the present study was to evaluate the beneficial and evident impact of incorporation different sources of dietary Zn on productive performance and economical efficiency of laying Japanese quails.

**MATERIALS AND METHODS**

The present investigation was conducted at El-Azab Poultry Research Station, Fayoum, Egypt, to evaluate the impact of addition several sources of dietary Zn on performance and economical efficiency of layer Japanese quails. A total number of six hundred and sixty six unsexed one-week old chicks of Japanese quail were used. Chicks were wing banded individually weighed and randomly distributed equally into sex dietary treatments of one hundred and eleven chicks each. Each dietary treatment was also subdivided equally into three replicates of thirty seven chicks each. The chicks were set in cleaned and fumigated battery brooders raised under similar environmental, managerial and veterinarian conditions. The temperature of brooding was nearly 35°C at the first week old, after that, it was gradually decreased according to usual brooding practices. While, along the egg production period the layers (from the same flock) were reared in quail community batteries also, under similar management, hygienic and environmental conditions. Chicks and layers of the different treatments consumed the experimental diets of growers and layers up to 6 weeks and 16 weeks of age, respectively. Fresh water and feed were available ad-libitum for both chicks and layers. A continuous light (natural and or artificial sources) was provided along the growing period (6 weeks), while, throughout the laying stage (ten weeks), layers were exposed to photoperiod for constant 16 hours.

Two types of zinc were used in the experiment: organic (zinc methionine imported and local) and inorganic (zinc sulphat). The imported zinc-methionine (zinc bound to DL – methionine) and local zinc-methionine (zinc bound to methionine hydroxy analogue) were obtained from Ibex international Company (28, Moraad Street, Giza, Egypt). These two products were registered in the Ministry of Agriculture, Egypt. The used inorganic source of Zn was Zn SO4(Feed Grade. These different commercial sources of dietary Zn were incorporated over the basal diets (the control diets) of either grower or layer quails at the level of 50 mg Zn/kg diet. The control diets of both the growing
and laying Japanese quails were formulated to meet their requirements (Table, 1), according to NRC (1994), and were prepared to be iso-nitrogenous (24, 20% CP) and iso-caloric (2900 ME/kg diet) for both the chicks and layers, respectively. Six experimental diets were utilized with these sex dietary treatments. However, the six experimental dietary treatments (T) were as follow:

1- T1: the basal diet (the control diet, C), without the experimental additives.
2- T2: C + 50 mg Zn (from Zn SO4)/kg diet.
3- T3: C + 50 mg Zn (from Zn SO4)/kg diet + 200 mg methionine/kg diet.
4- T4: C + 50 mg Zn (from imported zinc-methionine)/kg diet.
5- T5: C + 50 mg Zn (from local zinc-methionine)/kg diet.
6- T6: C + 200 mg methionine/kg diet.

Moreover, a continuous light (natural and or artificial sources) was provided along the growing period (6 weeks), while, throughout the laying stage (ten weeks), layers were exposed to photoperiod for constant 16 hours. In addition, feed intake (FI), egg number (EN), and egg weight (EW) were weekly recorded, and also, egg production percentage (EP %), egg mass (EM) and feed conversion ratio (FC) were weekly calculated. Furthermore, egg quality and fertility percentage were also studied according to (Hala, 1998, and Namra, 2000). Economical efficiency study was conducted according to input-output analysis as shown in Table, 4.

The data were statistically analyzed according to Steel and Torrie (1980), and the differences among means were separated using Duncan Multiple Range Test, (Duncan, 1955).

RESULTS AND DISCUSSION

Egg production traits:

Data in Table 2 showed that, inclusion of 50 mg Zn (from each of the three different sources) or 200 mg methionine/kg diet did not positively affect egg number, egg production % and egg mass, as compared to the control. The differences among all the different experimental groups were not significant. The control group achieved slight increase in egg number, egg production %

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and egg mass than the other experimental groups. However, the insignificant differences in egg production parameters may be attributed to the iso-nitrogenous and iso-energetic formula of the treated diets (El-Ghamry et al., 2004). Data of egg mass (Table, 2) showed similar trend to that found for egg production. This means that, EM values per layer were closely correlated with those of EP values. Kout El-Kloub et al., (2004) reported that, supplementing the diet with Zn- methionine or ZnO at two levels for both the two sources, 100, 150, 50 and 100 mg/kg diet, respectively, resulted in significantly greater egg production values than the control. In general, the findings of EN, EP and EM indicated that there was no positive response for Zn or methionine supplementation at levels 50 mg or 200 mg/kg diet, respectively. Furthermore, data of egg weight (Table, 2) showed that the differences among all the experimental groups were not significant, and the control group gave a slight decrease in egg weight than the other experimental groups. El-Habbak et al., (2005) declared that, egg weight proved to be negatively affected by high dietary Zn level applied (20000 ppm “mg \ kg” Zn SO4). However, Azazi et al., (2006) and Abd-Elsamee (2005) reported that adding methionine to laying hen diets increased egg weight value.

**Feed intake, FI and feed conversion ratio, FC**

The differences in FI and FC among the experimental groups (Table, 2) due to adding either the several sources of Zn (50 mg Zn/kg diet) herein or 200 mg methionine/kg diet were insignificant compared with the control group. Moreover, an incorporation of different sources of zinc to the diet of laying Japanese quails (50 mg Zn/kg diet) gave lower FI and better FC than the control diet. Hassan et al. (2003) found that, using 100 mg Zn plus 4 g methionine/kg diet improved FC, compared to the control group. However, the layers fed diet 5 (C + 50 mg Zn (from local zinc methionine)/kg diet), recorded the least FI, and also, realized the best FC values, compared to the other experimental groups. El-Habbak et al., (2005) accentuated that, adding Zn to the basal diet at the level of 2000 ppm severely significantly reduced the amount of feed consumed. Japanese quail layers fed diet supplemented with 50 mg Zn (from local Zn-methionine) recorded lower FI and realized better FC than the other experimental groups followed by those fed diet supplemented with 50 mg Zn (from ZnSO4). These finding may be attributed to that the activity of post absorbed organic Zn (Greene et al, 1988) as complex molecules might be metabolically different from their inorganic forms. So, methionione
supplementation to laying hen diets improved FC especially with dietary zinc (Hassan et al., 2003).

**Fertility %**

Fertility % (Table 2), indicated that, the differences among all the experimental groups were insignificant, with no clear trend resulting of consuming different experimental diets used in the present study. Furthermore, the best value of fertility percentage (96.07%) was attained with layers received the diet, 4 (C + 50 mg Zn from imported zinc methionine /kg diet. This may be due to the improvement in egg and semen quality and higher sexual efficiency of males for the late group, and methionine may be effective for improving Zn utilization in layers, (El-Habbak et al., 2005 and Hassan et al., 2003). Furthermore, Abdel Galil, and Abdel Samad, (2004) deduced that supplementing diets with Zn (100 mg/kg diet) improved fertility %. Also, Kout El-Kloub et al., (2004) reported that laying hens received diets supplemented with levels of either 100 or 150 mg zinc-methionine /kg diet resulted in significantly higher fertility percentage. While those supplemented with ZnO4 (at 50, 100 and 150 mg levels) and those of 50 mg zinc-methionine insignificantly increased fertility percentages compared to the control. It could be suggested that, Zn supplementation as Zn-methionine at a level higher than that of NRC (1994) recommendation improved fertility %.

**Egg quality**

Egg weight, yolk index and egg shape index of Japanese quail layers fed diets supplemented with 50 mg Zn or 200 mg methionine/kg diet were not significantly affected (Table, 3). The dietary treatments showed lower albumen weight% values than the control group which, significantly detected the highest value, and the differences among the dietary treatments were insignificant. The decrease in albumen weight % may be due to that diets supplemented with 50 mg Zn or 200 mg methionine/kg diet caused depreciation in total protein of blood serum (Harvey et al., 1993). However, inclusion 50 mg Zn or 200 mg methionine/kg over the control diet induced a positive effect on yolk weight %, however, the control group significantly recorded the least value, compared with the dietary treated groups, which appeared insignificant differences among them. Shell weight % values were tending to be reduced by dietary treatments, except treatment 2, "C + 50 mg Zn (from Zn SO4)/kg diet. This reduction in Shell weight % may be related to the antagonism between the high level of both
dietary Zn and Ca (El-Habbak et al., 2005), with reference to that, egg shell contain large amounts of calcium (Mc Dowell, 1992). Moreover, insignificant differences in shell weight percentage were observed among the experimental groups except for group 5, which, significantly detected the least shell weight percentage. Data of Table 3, revealed that, birds fed the different dietary treatments (except those fed died 4, "C + 50 mg Zn from imported zinc-methionine/kg diet"), significantly influenced yolk color with no specific trend, compared to the control diet, which had the highest value. Dietary treatments: 3 (C + 50 mg Zn (from Zn SO4 /kg diet + 200 mg methionine/kg diet) & 5 (C + 50 mg Zn from local zinc methionine/kg diet) significantly decreased egg shell thickness, as compared with other groups. However, no significant effect was observed in shell thickness between treatment, 2 (C + 50 mg Zn from Zn SO4/kg diet) and the other experimental treatments. In addition, there was a significant depression in shell thickness when laying Japanese quails fed the diets 5 (C + 50 mg Zn from local zinc-methionine/kg diet) & 3 (C + 50 mg Zn from Zn SO4 +200 mg methionine/kg diet), compared with the control group. Furthermore, nearly there was the same trend in both shell percentage and shell thickness. El-Habbak et al., (2005) deposed that, egg shell quality proved to be negatively affected by high dietary Zn level applied (20000 pp Zn SO4). From the above mentioned results, inclusion of Zn sources to the diets of laying Japanese quail insignificantly ameliorated both egg weight and yolk %values, but did not improve both albumen weight%, yolk color and egg shell quality (egg shell weight and egg shell thickness).

**Economical efficiency**

Layers received diet 5, recorded the best economical efficiency and relative economical efficiency, this may be due to the best FC and the least FI (Table, 4). While, the group consumed diet 2 brought out better economical efficiency than the other groups. However, the group used up diet 6, had the lowest economical efficiency and relative economical efficiency. Beside the least FI and the best FC, layers fed diet supplemented with 50 mg Zn (from local Zn-methionine), gave the highest economical efficiency and relative economical efficiency values. This could be profitable for poultry producer thereby, its enable them to bring down the cost of laying Japanese quail diets. Therefore, satisfactory economical efficiency could be attained after supplementing the diets of laying Japanese quail with either local Zn-methionine (50 mg Zn/kg diet) or Zn SO4 (50mg Zn/kg diet) to the diet of laying Japanese quail. This amelioration in economical efficiency and relative
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economical efficiency values for these layers fed on both diet supplemented with 50 mg Zn (from local Zn-methionine) and diet supplemented with 50 mg Zn (from ZnSO₄), could be related to low feed consumption and also due to improvement in FC.

On the basis of nutrition and economical point of view, it is suggested that, layers of Japanese quail consumed diet supplemented with 50 mg Zn (from local Zn-methionine) recorded the least feed cost/egg and the best economical efficiency value, followed by those supplemented with 50 mg Zn (from ZnSO₄), which achieved better economical efficiency than the other experimental groups.

Table (1): Composition and calculated analysis of the experimental diets of layers of Japanese quail.

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Layer diets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow corn</td>
<td>58.00</td>
</tr>
<tr>
<td>Soybean(44% CP)</td>
<td>17.00</td>
</tr>
<tr>
<td>Corn gluten meal (60%)</td>
<td>11.50</td>
</tr>
<tr>
<td>Wheat bran</td>
<td>5.00</td>
</tr>
<tr>
<td>Vegetable oil</td>
<td>0.90</td>
</tr>
<tr>
<td>Limestone</td>
<td>5.65</td>
</tr>
<tr>
<td>Di calcium phosphate</td>
<td>1.25</td>
</tr>
<tr>
<td>Premix*</td>
<td>0.30</td>
</tr>
<tr>
<td>Salt</td>
<td>0.30</td>
</tr>
<tr>
<td>DL– Methionine</td>
<td>0.10</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Crude protein %</td>
<td>20.06</td>
</tr>
<tr>
<td>ME, kcal/kg diet</td>
<td>2901.2</td>
</tr>
<tr>
<td>Crude fiber %</td>
<td>2.66</td>
</tr>
<tr>
<td>Ether extract %</td>
<td>2.86</td>
</tr>
<tr>
<td>Calcium %</td>
<td>2.52</td>
</tr>
<tr>
<td>Available phosphorus %</td>
<td>0.35</td>
</tr>
<tr>
<td>Lysine %</td>
<td>0.79</td>
</tr>
<tr>
<td>Methionine %</td>
<td>0.52</td>
</tr>
<tr>
<td>Cost/Ton of diet in L. E.***</td>
<td>2454.40</td>
</tr>
</tbody>
</table>

*Supplied per Kg of diet: vit. A, 12000 IU; vit. D3, 2200 IU; vit. E, 10mg; vit. K3 2mg; vit.B1, 1mg; vit.B2, 5mg; vit. B6, 1.5mg; vit. B12, 0.01mg; Nicotinic acid, 30mg; Folic acid, 1mg; Pantothenic acid, 10mg; Biotin, 0.05mg; Choline chloride, 500mg; Copper, 10mg; Iron, 30mg; Manganese, 60mg; Zinc, 50mg; Iodine, 1mg; Selenium, 0.1mg and Cobalt, 0.1mg.

** According to NRC (1994).

*** At time of experiment.
<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japanese quail layer (mean = 5.3 F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (g)</td>
<td>58.9 ± 1.3</td>
<td>58.2 ± 1.3</td>
<td>58.5 ± 1.3</td>
<td>58.7 ± 1.3</td>
<td>58.8 ± 1.3</td>
<td>58.9 ± 1.3</td>
</tr>
<tr>
<td>Egg mass (g)</td>
<td>3.0 ± 0.1</td>
<td>3.0 ± 0.1</td>
<td>3.0 ± 0.1</td>
<td>3.0 ± 0.1</td>
<td>3.0 ± 0.1</td>
<td>3.0 ± 0.1</td>
</tr>
<tr>
<td>Egg yield (g)</td>
<td>7.2 ± 0.2</td>
<td>7.2 ± 0.2</td>
<td>7.2 ± 0.2</td>
<td>7.2 ± 0.2</td>
<td>7.2 ± 0.2</td>
<td>7.2 ± 0.2</td>
</tr>
<tr>
<td>Egg conversion (F/E)</td>
<td>2.5 ± 0.1</td>
<td>2.5 ± 0.1</td>
<td>2.5 ± 0.1</td>
<td>2.5 ± 0.1</td>
<td>2.5 ± 0.1</td>
<td>2.5 ± 0.1</td>
</tr>
<tr>
<td>Feed intake (g)</td>
<td>112 ± 6</td>
<td>112 ± 6</td>
<td>112 ± 6</td>
<td>112 ± 6</td>
<td>112 ± 6</td>
<td>112 ± 6</td>
</tr>
<tr>
<td>Feed intake (g)</td>
<td>92 ± 6</td>
<td>92 ± 6</td>
<td>92 ± 6</td>
<td>92 ± 6</td>
<td>92 ± 6</td>
<td>92 ± 6</td>
</tr>
</tbody>
</table>

Table 2: Effect of feeding of the experimental diets on the number of quail, layer/week (E), g of conversion (%), g of yield (A), and g of production (%) in the diet (F).
Table (2): Effect of Feeding the Experimental Diet on Egg Quality of Leghorn Japanese Quail (Mean ± S.E.).

<table>
<thead>
<tr>
<th>Source</th>
<th>Zinc (mg)</th>
<th>Japanese Quail (mg)</th>
<th>Quail Tissue (mg)</th>
<th>Quail Tissue (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yolk Cores</td>
<td>657 ± 0.12</td>
<td>92 ± 0.06</td>
<td>79 ± 0.09</td>
<td>79 ± 0.09</td>
</tr>
<tr>
<td>Body Weight (%)</td>
<td>4.74 ± 0.03</td>
<td>6.27 ± 0.04</td>
<td>7.97 ± 0.04</td>
<td>7.97 ± 0.04</td>
</tr>
<tr>
<td>Test Weight (%)</td>
<td>3.20 ± 0.02</td>
<td>5.94 ± 0.03</td>
<td>6.59 ± 0.03</td>
<td>6.59 ± 0.03</td>
</tr>
<tr>
<td>Albumen Weight (%)</td>
<td>6.87 ± 0.04</td>
<td>9.78 ± 0.06</td>
<td>10.35 ± 0.07</td>
<td>10.35 ± 0.07</td>
</tr>
</tbody>
</table>

Note: A, B and C mean in the same row within the same column followed by different superscripts different significantly at P<0.05.
<table>
<thead>
<tr>
<th>Layer &amp; (mean ± SE)</th>
<th>Effect of different experimental diets on Farnesol and Farnesene for each diet</th>
<th>Farnesol (μg/g)</th>
<th>Farnesene (μg/g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (C)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Treatment</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 4: Effect of different experimental diets on Farnesol and Farnesene for each diet.
REFERENCES


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Different Sources, Zinc, Japanese Quail.


الملخص العربي

تقييم الامداد الغذائي بمصادر الزنك المختلفة باستخدام طيور السمان

1. أداء الإنتاجي للسمان الباض

محمد مصطفى محمود نمرة، هالة محمد عبد الواحد، حمدي محمد فاقي

المعهد الإنتاج الحيواني – مركز البحوث الزراعية – وزارة الزراعة – مصر

أجريت هذه الدراسة ببحث الدواجن بالعمر - الفيوم - مصر بثب تقييم تأثير إمداد العلف بعنصر الزنك (كفاية غذائية) من مصادر تجارية مختلفة (كربيتات الزنك، زنك - ميثيونين محلي، زنك - ميثيونين مستورد) على الأداء الإنتاجي و كفاءة الاقتصادية تطوير السمان البياض. وقد أضيف كل مصدر من هذه المصادر إلى العلف الأساسي (الغذاء الضابط، الذي يحتوي على 50 ملجم زنك/كم غذاء) متفرداً بمستوى 50 ملمز زنك/كم غذاء. واستخدم في هذا التجربة 666 كنث كوكب سمان بياني عمر اسبوع، تم توزيعها عشوائياً إلى ست مجاعم تجريبية ذات عدد متساوي، لكل مجموعة تجريبية قسمت عشوائياً إلى ثلاثة مكررات متساوية أيضاً في الحجم. وضعت جميع المعاملات التجريبية الستة في ظل ظروف مماثلة من الرعاية والتربيعة إلى نهاية التجربة التي امتدت إلى عمر 8 أسابيع.

غذى المجاعم التجريبية الستة على ست معاللات غذائية كما هو مبين:

1. المعالمة الأولى (علف 1): الغذاء الضابط (الغذاء الكنترول) + 50 ملم زنك/كم غذاء من كربيتات زنك.
2. المعالمة الثانية (علف 2): الغذاء الضابط (الغذاء الكنترول) + 50 ملم ميثيونين / كجم غذاء من كربيتات زنك.
3. المعالمة الثالثة (علف 3): الغذاء الضابط (الغذاء الكنترول) + 50 ملم/كم غذاء زنك + 200 ملم ميثيونين / كجم غذاء من كربيتات زنك.
5. المعالمة الخامسة (علف 5): الغذاء الضابط (الغذاء الكنترول) + 50 ملم زنك/كم غذاء من زنك - ميثيونين محلي.
6. المعالمة السادسة (علف 6): الغذاء الضابط (الغذاء الكنترول) + 200 ملم ميثيونين / كجم غذاء من زنك - ميثيونين مستورد.

Different Sources, Zinc, Japanese Quail.

وكانت اهم النتائج المتحصل عليها كما يلي:

1 - لم يكن لإضافة الزنك (بمقدار 50 ملجم زنك/كم غذاء) أو الميثيونين (بمقدار 200 ملجم زنك/كم غذاء) تأثير إيجابي على كل من عدد البيض/طائر/اسبوع، نسبة إنتاج البيض/طائر/يوم، و كمية البيض/طائر/اسبوع.

2 - أعطت طيور الهمان الياباني البداية المغذية على غذاء قاعدي (مضاف إلية 50 ملجم زنك/كم غذاء) (من زنك – ميثيونين مستورد) أعلا نسبة إخصاب.

3 - لم يكن لإضافة كل من الزنك (بمقدار 50 ملجم زنك/كم غذاء) أو الميثيونين (بمقدار 200 ملجم زنك/كم غذاء) تأثير معنوي على كل من وزن البيضة، دليل الصفار، دليل شكل البيضة. كما أن إضافة لم تحسن من وزن الألبومين أو لون الصفار ولا من الصفات النوعية لقشرة البيضة.

احتراز الزنك لزيادة مولد في كل من إنتاج البيض، وزن البيضة، كمية البيض، الكفاءة الاقتصادية. بينما اضافة الزنك، ميثيونين أدى إلى زيادة نسبة الخصوبة، وتحسين كل من وزن البيضة ولون الصفار بصورة غير معنوية، إلا ان اضافة لم تحسن من كل من وزن الألبومين ولون الصفار والصفات النوعية لقشرة البيضة.