



**Productive performance of *Benha* local strain hens as
influenced by housing system and dietary *Biotin*
supplementation**

By

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SUMMARY AND CONCLUSION

The present study was carried out at the Poultry Research Farm, Department of Animal Production, Faculty of Agriculture, Benha University. Experimental work lasted from November 2015 to May 2016.

It was aimed to evaluate the effect of housing system and different dietary biotin levels on productive and metabolic performance of Benha line chicken.

A total number of one – day old chicks of 600 Benha line chicks used in this study, chicks were reared on a floor brooder housing using gas heated brooder to provide ideal brooding temperature. Wood straw was used as a litter and was changed three times throughout the brooding period. Birds were rearing under the same hygienic and managerial conditions.

A total number of 224(200 hens and 24 cocks), Benha line chickens 20 weeks old and mean of body weight $1742 \pm SE$ were equally divided into two groups. Pullets of the first group were housed in cages of laying battery; two birds were kept per cage of $48 \times 40 \times 40$ cm ($960\text{cm}^2/\text{bird}$). Pullets of the second group were kept in deep litter laying houses in a density of $900\text{cm}^3/\text{bird}$ (floor system). Chickens of each group were then subdivided into four sub groups each of 25 females and 3 males according to dietary biotin supplementation. Pullets of the 1st sub group were fed on basal layer diet (layer diet) and considered as control group, the 2nd, 3rd and 4th sub group were fed on basal diet supplemented with biotin at a levels of 100, 150 and $200\mu\text{g}/\text{kg}$ diet, respectively.

Body weight was recorded at sexual maturity, at the peak of egg production and at the end of the experiment period. Feed consumption and conversion, traits of egg production performance (age at sexual maturity, egg production, egg weight, egg mass), traits of egg quality

(egg shape index, albumen index, yolk index, absolute and relative weights of egg component, shell thickness, haugh unit), fertility, hatchability, and embryonic mortality were estimated.

Serum calcium and inorganic phosphorus , plasma protein fractions (total protein, albumen and globulin) cholesterol, triglycerides, high-density lipoproteins, low density lipoproteins, enzymes of transaminases (AST and ALT), creatinine and uric acid, were estimated at sexual maturity, at the peak of egg production and at the end of experimental period.

Results obtained could be summarized as follows:

- 1- The higher body weight was found in birds reared in cages system and fed diet supplemented with biotin at a level of (200 $\mu\text{g}/\text{kg}$ diet).
- 2- Pullets of control group reared under deep floor litter laying houses had the highest average of feed consumed.
- 3- Applying biotin at a level of 150 $\mu\text{g}/\text{kg}$ diet resulted in decreasing feed consumption as compared with control group and other levels of biotin.
- 4- Feed conversion improved by pullets housed in cages and diet supplemented with biotin at a level of 150 $\mu\text{g}/\text{kg}$ diet.
- 5- Average age at sexual maturity decreases by 17.14 days for bird kept in battery cages than those reared in deep litter laying houses.
- 6- Average age at sexual maturity decreases by 6.99 days for birds fed diet supplemented with biotin at a level of 150 $\mu\text{g}/\text{kg}$ diet when compared with control group.
- 7- Feeding birds diet supplemented with different levels of biotin decreased age at sexual maturity when compared with control group.

- 8- The highest averages of egg production, egg weight and egg mass were found in group of birds reared in cages.
- 9- Feeding bird's diet with 150 μg biotin /kg had the highest averages of egg production and egg mass.
- 10- Feeding bird's diet with 100 μg biotin /kg had the highest average of egg weight.
- 11- Birds housed in cages had the highest averages of egg shape index, albumen index and yolk index than those housed in deep floor litter.
- 12- Pullets fed diet supplemented with 150 μg biotin /kg had the highest averages of albumen index and yolk index.
- 13- The higher average of egg shape index was found in pullets fed diet supplemented with biotin at a level of 100 μg /kg.
- 14- Pullets housed in cages increased absolute and relative weights of egg shell, albumen and relative weight of yolk than those housed in deep floor litter.
- 15- The higher averages of absolute and relative weights of albumen and relative weight of egg shell were found in pullets fed diet supplemented with biotin at a level of 100 μg /kg diet.
- 16- The highest averages of absolute weight of shell and yolk were found in pullets fed diet supplemented with biotin at a level of 150 and 200 μg /kg, respectively.
- 17- The highest averages of egg shell thickness and haugh unit were found in birds reared in deep litter laying houses than those produced from birds reared in cages.
- 18- Birds fed diet supplemented with biotin at a level of 150 and 200 μg /kg had the highest averages of egg shell thickness and haugh unit, respectively, compared with other levels applied and control group.

- 19- Birds housed on deep floor litter had the highest average of fertility (82.70 %). However birds housed in battery cages had the highest average of hatchability (88.10 %).
- 20- Feeding pullets diet supplemented with biotin at a level of 150 μg /kg had the highest average of fertility (86.87 %) and hatchability (89.29 %), respectively when compared with different levels applied and control group.
- 21- Birds housed in battery cages had the lower average of embryonic mortality rate (11.00 %) when compared with those reared on deep litter (19.40%).
- 22- Feeding pullets diet supplemented with biotin at a level of 150 μg /kg had the lower average of embryonic mortality (10.79 %) when compared with other levels of biotin applied and control group.
- 23- The highest levels of serum calcium and inorganic phosphorus were found in pullets reared on deep floor litter compared with those reared in battery cages system.
- 24- Feeding pullets diet supplemented with biotin at a level of 150 and 100 μg /kg had the highest level of serum calcium (6.97) and inorganic phosphorus (3.79 mg/dl), respectively when compared with different levels applied and control group.
- 25- Birds housed on deep floor litter had the highest plasma level of total protein. However birds housed in battery cages had the highest plasma levels of albumen and globulin.
- 26- Birds fed diet supplemented with biotin at a level of 100 μg /kg increased plasma level of albumen as compared with birds of other experimental groups.

- 27- The lowest levels of plasma cholesterol (118.46) and triglycerides (660.81 mg/dl) were found in birds housed in deep floor litter laying houses.
- 28- The lowest levels of plasma cholesterol (120.95mg/dl) and triglycerides (629.26mg/dl) were found in birds fed diet supplemented with biotin at a level of 200 and 150 μg /kg, respectively.
- 29- The lowest levels of plasma high- density lipoprotein (20.16) and low- density lipoprotein (66.26 mg/dl) were found in birds housed on deep floor litter laying houses than those of battery cages.
- 30- The lowest levels of plasma high- density lipoprotein (24.90) and low- density lipoprotein (65.19 mg/dl) were found in birds fed diet supplemented with biotin at a level of 100 and 150 μg /kg, respectively.
- 31- The lowest level of plasma AST transaminase (120.21 U/L) was estimated in birds housed in cages. However the lower level of plasma ALT transaminase (45.95 U/L) was estimated in birds housed on deep floor litter laying houses.
- 32- The lowest levels of plasma AST and ALT transaminase were estimated in birds fed diet supplemented with biotin at a level of 100 μg /kg.
- 33- The lower averages of blood plasma uric acid (6.38 mg/dl) and creatinine (1.13 mg/dl) were found in birds housed in battery cages.
- 34- The lower averages of blood plasma uric acid (5.87) and creatinine (1.11 mg/dl) were found in birds fed diet supplemented with biotin at a level of 200 μg /kg.

Conclusion

It could be concluded that biotin supplementation at a level of 150 and 100 $\mu\text{g}/\text{kg}$ in layer diet and reared in battery cages and on deep litter system, respectively seemed to be adequate to achieve the favorable results and its being recommended from the economic point of view.