

EFFECT OF VARYING LEVEL OF CRUDE PROTEIN AND METABOLISABLE ENERGY ON EGG PRODUCTION AND EGG QUALITY OF LAYING BIRDS

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Abstract

The experiment centered on studying the influence of different crude protein and metabolizable energy levels on the egg production rate and egg quality among black nera laying birds. The five weeks study involved 40 point of laying birds (black nera) in a complete randomized design. The birds were divided into 4 treatment groups and fed diets with crude protein 15%, 16%, 17% and 18% and metabolizable energy of 2300, 2405, 2500 and 2600 kcal/kg for diets 1, 2, 3 and 4 respectively. The result showed average feed intake of 0.1kg, 0.073kg, 0.106kg and 0.114kg per bird per week for each of diets 1, 2, 3 and 4 respectively. The average egg production rate per week per bird were 3.8, 2.54, 3.68 and 4.38, while the average egg weights were 58.38g, 59.64g, 65.12g and 61.80g for diets 1, 2, 3 and 4 respectively, with diets 4 and 3 significantly differ. Other eggs quality parameter showed no significant difference. From the result obtained one can conclude that the bird preferred diet 4 which contain 18% crude protein and metabolisable energy of 2600kcal/kg. In view of this, I recommend that the feedmill industry utilize the compositions of diet 4 for mass production of layers' feed. Furthermore, the feed trial can be investigated at different geographical zones of the country in order to determine the response of the birds at different zones.

Introduction

The current global warming and climate change has worsened the food crisis in Nigerian. The effect is on both crop and animal production. Egg which is the best food known to man (Oluyemi and Robert, 2002 and Afolayan, 2002) is getting out of the reach of an average Nigerian. Laseinde (2002) revealed that the protein of egg has 100% value and serves as reference for other protein. Furthermore, egg equally act as leavening agent in baked food, serves as thickening agent in custard, puddling and cream filing. Its use is also found in leather tanning, photo engraving, production of vaccine and certain drugs (Laseinde, 2002 and Afolayan, 2006).

However, the usefulness of egg mentioned earlier depends on its nutritional content as well as certain quality parameters present in the egg. In addition, the nutrients and quality parameters together with rate of production are largely influence by the metabolisable energy and crude protein available in the diet of the laying bird (Olorede, 1998 and Aduku, 2004).

It is in view of this that the research work centers on varying the level of the Metabolisable Energy (ME) and Crude Protein (CP) of the diets fed to layers with a view to determining which of the diets will give the best result in term of egg production and egg quality assessment.

Material and Method

Forty points of lay (Black nera) birds age 24 weeks were used in this complete randomized design (CRD) experiment. The birds were divided into four treatment diet groups with ten laying birds fed with each diet. The diet formulated contained 15%, 16%, 17% and 18% crude protein for diet 1, 2, 3 and 4 respectively. The metabolisable energy contents of the diet were 2300, 2405, 2500 and 2600kcal/kg respectively. See Table 1 for the feed compositions.

Daily egg productions were taken for 5 weeks. At the end of each week, average feed intake was taken. Also, 5 eggs of each dietary treatment were randomly selected for egg quality treatment.

Table 1: Compositions of the Experimental Diets

Ingredients	% inclusion in (kg)			
	Diet 1	Diet 2	Diet 3	Diet 4
Maize	37.07	41.90	46.27	50.87
Groundnut cake	10.62	14.07	19.42	23.82
Wheat offal	40.71	32.00	22.71	31.71
Bone meal	4.00	4.00	4.00	4.00
Lime stone	7.00	7.00	7.00	7.00
Salt	0.30	0.30	0.30	0.30
Premix	0.30	0.30	0.30	0.30
Total	100	100	100	100
Crude protein	15%	16%	17%	18%
Me (kcal/kg)	2300	2405	2500	2600

Result

Results of the feed intake, rate of eggs production and egg quality assessment are shown in table 2, 3, and 4. With regard to the feed intake, the birds consumed more of diet 4 while diet 2 was least consumed.

The feed intake of birds fed diet 4 and 3 were significantly higher than diet 2. Bird fed with diet 4 produced the highest number of eggs with average of 4.38 eggs per week per bird. In term of egg weight, diet 3 produced the heaviest egg with an average of 65.12g, which is significantly higher than the rest, followed by diet 4.

All other parameters: shell weight, shell thickness, albumen weight and height, yolk weight, length and diameter followed the same pattern as the egg weight with slight variation but not significant different between each other.

Table 2: Average Weekly Feed Intake of Layers Fed Different Diets

Weeks	Feed Intake			
	Diet 1	Diet 2	Diet 3	Diet 4
1	0.89	0.89	1.05	1.27
2	0.87	0.75	1.06	0.92
3	1.00	0.96	0.96	1.10
4	1.11	1.10	1.00	1.30
5	1.12	0.86	1.27	1.10
Total	4.99	3.67	5.31	5.69
Average per bird per week	0.1	0.073	0.106	0.114

Table 3: Weekly Production Rate of Layers Fed Different Diet (Total Production)

Weeks	% inclusion in (kg)			
	Diet 1	Diet 2	Diet 3	Diet 4
1	37	24	33	41
2	39	25	34	51
3	38	25	38	47
4	38	25	32	37
5	37	28	47	43
Total	189	127	184	219
Average per bird per week	3.8	2.54	3.68	4.38

Table 4: Average Egg Quality Assessment of Different Diets (DIET)

Parameter	Diets			
	Diet 1	Diet 2	Diet 3	Diet 4
Egg weight	58.78	59.64	65.12	61.82
Shell weight	7.35	7.43	7.09	7.45
Shell thickness	0.057	0.0859	0.0858	0.0923
Albumen weight	34.76	35.57	35.17	35.57
Albumen height	0.68	1.63	0.68	0.72
Yolk weight	16.11	16.68	16.42	17.19
Yolk height	1.51	1.60	1.68	1.63
Yolk diameter	3.81	3.59	3.78	3.72

Discussion

The egg production increases with increase in feed intake in the birds. This was in conformity with the work of Olorede (1998) and Aduku (2002) which were of the opinion that as laying bird increases its egg production, its feed intake also increases.

This is likely due to the fact that more feed is needed for the formation of more egg since the egg components are derived from the feed intake.

Also, diet 4 which produced an average of 4.38 egg per bird per week supports the work of Olomu (2003), which revealed that a good layer produces an average of 5 eggs per week. The lowest egg weight was seen among the bird fed diet 1. The reason may be due to the fact that this diet contained the lowest energy and crude protein as could be seen in the table of composition of experimental diet.

Conclusion

From the result, diet 4 produced the best outcome both in terms of rate of egg production and egg weight. Even in the area of egg quality parameters, birds fed diet 4 competed favourably with other diets. This diet is therefore recommended for laying birds. This is closely followed by diet 3 and 1. The least performance was recorded among birds fed with diet 2.

Recommendation

The joy of every researcher is to see that the result is utilized by the stakeholders. In view of this I recommend that the feedmill industry make use of the compositions of diet 4 for mass production of layer mash.

Also since the experiment was carried out in North West part of Nigeria, the trial can be conducted in other geographical zones to examine the response of the birds at these various zones.

References

- Aduku, A. O. (1992): *Practical livestock feeds production in the tropics*, S. Asekome and Pub. Co. Zaria, P. 45.
- Aduku, A. O. (2004): *Animal nutrition in the tropics*, Davcon Co., Zaria. P. 52
- Afolayan, G. G. (2002): The replacement value of maize bran for maize in broiler Diets. Msc. dissertation. Usman Danfodiyo University, Sokoto.
- Afolayan, G. G. (2006): Protein and metabolizable energy requirement of broilers and layers in semi-arid environment, Ph.D Research Proposal.
- Laseinde, E. A. O. (2002): Poultry: God's goldmine in the livestock industry. *Nigerian university inaugural lecture series*, 2002. NUC Pub. Pp. 748-849.

Olomu, J. M. (2003): *Poultry production, a practical approach*. Jachem Pub. Benin City. P. 97.

Olorede, B. R. (1998): Sheabutter cake as an unconventional feed ingredient in the diet of layer and broilers. Ph. D Thesis University of Ibadan.

Oluyemi & Robert (2000): *Poultry production in warm wet climate*. Macmillan Pub. Ltd. London 2nd Ed., Pp. 58 – 59.