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The Effect of Adding Different Levels of Dried Chicken Eggshell Powder on The Egg Productivity Traits of the Lohman Layer Chicken.

Essam Tahseen Dawoodi [1] **Rashid Hasan Dalawi [2]**
[1] *Animal production division, Directorate of agriculture, Kirkuk, IRAQ.*
[2] *Animal production department, college of agriculture, Kirkuk university, Kirkuk, IRAQ.*
*Corresponding Author: essamtaseen@gmail.com.

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ABSTRACT
This study was conducted at the Department of Animal Production, College of Agriculture, University of Kirkuk, from 7/24/2023 to 10/1/2023, with one hundred 28-week-old birds used, distributed randomly among five treatments, twenty birds for each treatment, and placed in production batteries inside a hall. The birds from each treatment were distributed into five replicates, with four birds per replicate. The five treatments were: T1=100% limestone + 0% eggshell powder, T2= 75% limestone + 25% eggshell powder, T3= 50%limestone + 50% eggshell powder, T4= 25% limestone + 75% eggshell powder, T5= 0% limestone + 100% eggshell powder. The eggshell was boiled, washed, dried in the sun for 3 days, broken and crushed, and mixed with the feed. The study found that adding different levels of eggshell powder significantly affected egg weight, egg number, and egg production (HD). However, it disagreed with previous studies that found adding different resources and concentrations of calcium in the layers' diet did not significantly impact HD.

Keywords**:** Layers, calcium, powder, eggshell.

INTRODUCTION

For laying hens, calcium is crucial since the egg shell contains 90% mineral matter, of which 98% is calcium carbonate [1]. Eggshell flaws can result in losses ranging from 6 to 8% of the total eggs a hen lays [2]. [3] calculated that losses resulting from cracked and/or broken eggs range from 6.0 to 12.3% annually in Brazil. The use of calcium from chicken bones to produce eggshells caused a quick loss of 2 grams of calcium from the body, as reported by [4]; hence, a calcium reserve needs to be formed in the bones before the production period. Eggshell quality is influenced by calcium supply, particle size, and solubility [5]. The quantities of protein, phosphate, zinc, free fatty acids, and vitamin D affect how well calcium is absorbed. One of the most crucial factors, according to [6], is calcium solubility because the body needs to dissolve calcium for the digestive system to absorb it.

[7] There were no appreciable changes in eggshell quality or egg production when oyster shell or highly soluble limestone was substituted for low-soluble limestone, or vice versa. In vivo and in vitro research was done on the connection between calcium level, source, particle size, and solubility. According to [8], the gizzard retains more limestone when the feed's calcium content is high or the solubility is reduced. Calcium is a crucial ingredient in commercial laying hen feed for developing eggshells. The amount of calcium that is fed appears to affect the hypothalamus, causing the production of norepinephrine, a neurotransmitter that works in the central nervous system and stimulates feed intake [9]. This indicates that feed calcium can affect feed intake. The eggshell serves as a container for the egg's contents and shields the embryo; hence, it must be robust enough to endure the laying, gathering, sorting, and shipping of the eggs until the intended recipient receives them. Due to consumers' growing concerns about food safety and the possibility of bacterial contamination, eggshell quality is particularly important from a business standpoint [10]. There are several ways to supply calcium, including oyster shell, eggshell, calcium sulfate, and limestone. Of these, oyster shell and limestone are the most frequently utilized in laying hen diets [10].

Understanding calcium sources that can replace calcareous limestone is crucial for preserving or enhancing eggshell quality and performance, as commercial laying hens have high calcium requirements.

Materials and methods:

The experiment was conducted in the fields of the Department of Animal Production, College of Agriculture, University of Kirkuk, for the period from 7/24/2023 to 10/1/2023, to add different levels of chicken egg shell powder to the diet of Lohman laying hens and its effect on productive performance. One hundred 28-week-old birds were used, distributed randomly among five treatments, twenty birds for each treatment, and placed in production batteries inside a hall measuring 5 meters by 15 meters. The birds from each treatment were distributed into five replicates, with four birds per replicate. The five treatments were: T1=100% limestone + 0% eggshell powder, T2= 75% limestone + 25% eggshell powder, T3= 50%limestone + 50%

eggshell powder, T4= 25% limestone + 75% eggshell powder, T5= 0% limestone + 100% eggshell powder. The eggshell was boiled for an hour in water, then washed well and cleaned of impurities. Once the washing was completed, the eggshell was dried in the sun for 3 days, stirring constantly. After the end of the drying period, the eggshell was broken and crushed using a grinder, after which it was ready to be mixed with the feed. Five parameters were used for the duration of the experiment, and the components and chemical composition of the materials included in the composition of the diets are shown in Table 1.

Table1: The percentage and chemical composition of the feed materials fed to experimental birds

Ingredients	control
Wheat	16.30
Yellow corn	47.07
Soybean meal (48%)	20.00
Barley	4.00
Oil	0.60
Limestone	9.00
T. Salt	0.20
Methionine	0.07
Lysine	0.01
Laymix 2.5	2.50
Colin Chloride	0.25
Total	100.00
Energy / protein ratio	167.03
Energy	2753
Protein%	16.08
Lysine%	0.81
Methionine%	0.44
Calcium%	3.76
Phosphors%	0.41

The females weighed each treatment separately at the beginning and end of the experiment, using a sensitive balance (0.01) g. Eggs were weighed twice a week using a sensitive scale with a sensitivity of (0.01) g at a rate of 8 eggs per replicate. The mass of eggs was calculated using the equation below [11]:

Egg mass = egg production percentage x average egg weight x number of days

The weekly production for each replicate was calculated based on HD, as in the equation below [12]:

Egg production (HD%) = (number of eggs produced during a period/length of period in days' x number of birds) x 100.

The weekly feed consumption of the repeats was calculated according to the equation below [13]:

Feed consumed (g) = amount of feed provided at the beginning of week - remaining feed at the end of week The feed conversion factor for each bird was calculated according to the equation below [14]: Feed conversion Ratio=amount of feed consumed/mass of eggs produced The numbers of birds killed for each replicate were recorded daily and calculated as a percentage as in the equation below [15]:

Mortality rate = (number of birds killed / total number of birds) x 100 SAS version 4.9 and the CRD method were used to analyze the data, and Duncan's multi-range test [16] was employed to determine how much the means of the coefficients for each attribute under study varied from one another

Results and discussion:

The mean and standard error for the egg weight that was treated with different levels of eggshell powder for different periods are shown in Table 2. The egg weight was differing significantly in most periods ($p<0.05$). For the first week until the fifth week the treatment three and four were exceed other treatments, and the least of them was second treatment. For the treatment six, the least was the fifth treatment, and the other did not show and differences between them. There were non-significant differences among the treatments in the seventh and eighth weeks. The ninth week the treatment three was the least, and there were non-significant differences among the other treatments. The tenth week, treatment three and fife was the least and there were non-significant differences among the other. Our study agreed to [17], which find in his study that adding different level and resource of calcium effected significantly to the egg weight. And also agreed to [18], that find in his study that adding different recourse and levels of eggshell powder, and oyster shell affected significantly on the egg weight. Moreover, our finding disagreed with [19], which found that the egg weight did not significantly affect the recourse or the concentration.

Table 2: the mean of egg weight that treated with different levels of eggshell powder for different periods

Periods	T1 Control	T2 25% Ca	T3 50% Ca	T4 75% Ca	T5 100% Ca
W 1	55.80±2.07 c	55.82±5.71 c	57.93±1.37 a	57.74±2.21 a	56.28±1.30 b
W 2	57.31±1.53 b	55.44±3.13 c	58.70±4.00 a	59.44±1.67 a	56.54±2.60 b

W 3	57.80±1.29 b	55.43±2.46 c	58.59±2.49 a	58.08±2.92 a	58.60±2.67 a
W 4	55.52±1.78 b	49.84±5.07 c	58.59±2.07 a	57.73±1.19 a	54.87±1.88 b
W 5	55.20±1.66 b	55.34±3.85 b	58.29±1.44 a	57.42±1.96 a	55.70±2.98 b
W 6	58.99±6.28 a	60.07±1.11 a	58.93±0.62 a	58.91±4.07 a	55.89±1.95 b
W 7	59.88±1.67 a	60.11±2.90 a	58.69±1.37 a	60.64±2.27 a	57.92±3.05 a
W 8	59.48±1.87 a	59.96±1.51 a	58.08±2.11 a	58.60±4.17 a	59.75±2.51 a
W 9	60.78±1.09 a	59.84±2.48 a	57.27±2.17 b	59.93±3.41 a	60.11±2.19 a
W 10	59.65±2.33 a	59.11±1.93 a	56.98±3.96 b	58.57±3.39 a	57.04±3.83 b

*Different letters within one row indicate the presence of significant differences ($p<0.05$) between the coefficients.

The mean and standard error for the egg number that were treated with different levels of eggshell powder for different periods are shown in Table 3. The egg weight was differing significantly in most periods ($p<0.05$). for the first week until the sixth week the treatment three was exceed compere with the other treatments, and from the seventh week until the tenth week the treatment five was exceed above the other treatments. Our study agreed with each of [18, 20], and disagreed with [21].

Table 3: The mean of egg number that treated with different levels of eggshell powder for different periods

Periods	T1	T2	T3	T4	T5
	Control	25% Ca	50% Ca	75% Ca	100% Ca
W 1	19.60±1.95 d	23.40±0.55 b	26.20±1.48 a	23.40±2.61 b	22.40±2.30 c
W 2	23.40±3.36 b	22.60±3.05 c	26.40±1.67 a	22.20±2.59 c	23.60±2.88 b
W 3	24.40±2.70 b	19.20±2.49 d	25.80±1.92 a	22.80±2.78 c	23.20±3.56 bc
W 4	21.20±3.96 c	18.00±2.92 d	26.00±0.06 a	23.00±2.83 b	23.20±3.35 b
W 5	21.60±3.78 c	11.80±2.28 d	24.20±1.48 a	23.00±2.34 b	24.20±3.03 a
W 6	23.20±4.21 b	18.60±5.86 d	24.60±0.55 a	21.60±1.52 c	23.80±3.70 b
W 7	25.00±2.00 a	21.80±4.81 c	23.80±1.92 b	23.40±3.58 b	25.20±3.12 a
W 8	24.20±1.30 b	23.60±4.04 c	20.00±1.41 d	19.60±0.55 d	25.60±3.78 a
W 9	24.80±2.78 b	23.80±3.27 c	17.20±3.96 d	18.60±2.88 d	25.40±2.88 a
W 10	25.20±2.49 a	24.20±4.09 b	23.00±2.65 c	24.20±2.59 b	25.80±3.84 a

*Different letters within one row indicate the presence of significant differences ($p<0.05$) between the coefficients.

The mean and standard error for the egg production (H.D.) that treated with different levels of eggshell powder for different periods are shown in table 4. The egg production (HD) differed significantly in most periods ($p<0.05$). For the first week until the fourth week, treatment three exceeded the other treatments, and for the fifth week until the tenth week, treatment five exceeded all the other treatments. Our study was disagreed with each of [21] that find adding different recourse and concentration of calcium in layers' diet did not significantly on the HD.

Table 4: the mean of egg production (HD) that treated with different levels of eggshell powder for different periods

Periods	T1	T2	T3	T4	T5
	Control	25% Ca	50% Ca	75% Ca	100% Ca
W 1	70.00±6.96 c	83.57±1.95 b	93.57±5.29 a	83.57±9.31 b	80.71±8.22 b
W 2	83.57±12.01 b	80.71±10.89 b	94.29±5.98 a	79.29±9.24 c	84.29±10.29 b
W 3	87.14±9.65 b	68.57±8.89 c	92.14±6.87 a	86.19±9.62 b	87.38± 9.73 b
W 4	75.71±14.15 c	64.29±10.41 d	92.86±0.01 a	86.67±6.54 b	87.14±5.98 b
W 5	77.14±13.51 c	47.86±13.51 d	86.43±5.30 b	86.67±3.30 b	91.19±7.22 a
W 6	82.86±15.03 b	72.62±14.82 c	87.86±1.96 ab	82.14±11.29 b	89.29±6.68 a
W 7	89.29±7.14 ab	85.95±8.76 b	85.00±6.87 b	87.85±6.96 b	95.00±7.83 a
W 8	86.43±4.66 b	93.57±5.55 a	71.43±5.05 c	74.52±9.05 c	95.95±4.26 a
W 9	93.33±2.74 a	94.76±5.36 a	61.43±14.15 c	74.29±7.74 b	95.71±5.87 a
W 10	95.00±4.07 a	95.95±5.56 a	82.14±9.45 b	96.67±6.03 a	96.67±3.89 a

*Different letters within one row indicate the presence of significant differences ($p<0.05$) between the coefficients.

The mean and standard error for the egg mass that treated with different levels of eggshell powder for different periods are shown in table 5. The egg mass was differing significantly in most periods ($p<0.05$). For the first week until the sixth week, treatment three exceeded the other treatments, for the seventh week until the ninth week, treatment five exceeded all the other treatments, and in the tenth week, treatment one was the highest among the other treatments. Our study agreed with both [18, 21], that recorded in their studies the egg mass differ significantly by using eggshell powder in different concentrations.

Table 5: The mean of egg mass that treated with different levels of eggshell powder for different periods

Periods	T1	T2	T3	T4	T5
	Control	25% Ca	50% Ca	75% Ca	100% Ca
W 1	273.30±27.96 c	326.79±36.95 ab	379.81±30.03 a	337.49±37.43 ab	318.03±34.25 b

W 2	335.95±53.98 ab	314.00±50.79 b	388.13±43.09 a	330.31±43.60 ab	334.67±52.85 ab
W 3	353.00±43.71 ab	266.30±37.19 c	378.22±36.64 a	33.015±33.38 b	339.64±52.41 ab
W 4	295.35±62.01 c	222.59±29.70 c	380.86±13.43 a	331.75±39.71 ab	318.87±52.67 b
W 5	299.10±57.72 bc	163.38±34.25 c	352.52±20.90 a	330.06±34.83 ab	337.40±49.69 ab
W 6	344.68±87.57 ab	279.36±88.23 c	362.45±10.76 a	319.00±40.80 b	332.65±64.90 ab
W 7	374.65±37.01 a	328.81±79.59 b	349.09±28.13 ab	354.36±53.51 a	365.41±54.19 a
W 8	359.98±24.60 b	354.05±63.03 b	290.56±25.71 c	287.39±24.76 c	382.88±62.63 a
W 9	376.70±41.20 ab	356.31±52.88 ab	246.36±58.38 c	278.39±36.95 bc	381.25±40.97 a
W 10	374.87±28.53 a	359.11±71.26 ab	329.73±58.94 b	353.99±40.34 ab	357.16±52.26 ab

*Different letters within one row indicate the presence of significant differences ($p<0.05$) between the coefficients.

The mean and standard error for the feed intake that treated with different levels of eggshell powder for different periods are shown in table 6. The feed intake was differing significantly in most periods ($p<0.05$). For the first week the treatment three was the highest feed intake compare with the other treatments. For the second week to the tenth week, the treatment five was the highest among the other treatments. Our study was agreed with [21] that find using different recourse of calcium and concentration. Moreover, [18] find the feed intake in his study significantly differ when he uses different concentration of eggshell powder.

Table 6: for the feed intake that treated with different levels of eggshell powder for different periods are shown

Periods	T1 Control	T2 25% Ca	T3 50% Ca	T4 75% Ca	T5 100% Ca
W 1	629.95±8.47 ab	603.30±8.47 b	688.45±8.47 a	620.75±8.47 ab	652.15±8.47 ab
W 2	680.75±8.47 b	682.00±8.47 ab	683.25±8.47 ab	684.50±8.47 a	685.75±8.47 a
W 3	687.00±8.47 b	688.25±8.47 ab	689.50±8.47 ab	690.75±8.47 a	692.00±8.47 a
W 4	693.25±8.47 b	694.50±8.47 ab	695.75±8.47 ab	697.00±8.47 a	698.25±8.47 a
W 5	699.50±8.47 b	700.75±8.47 ab	702.00±8.47 ab	703.25±8.47 a	704.50±8.47 a
W 6	705.75±8.47 b	707.00±8.47 ab	708.25±8.47 ab	709.50±8.47 a	710.75±8.47 a
W 7	712.00±8.47 b	713.25±8.47 ab	714.50±8.47 ab	715.75±8.47 a	717.00±8.47 a
W 8	718.25±8.47 b	719.50±8.47 ab	720.75±8.47 ab	722.00±8.47 a	723.25±8.47 a
W 9	724.50±8.47 b	725.75±8.47 ab	727.00±8.47 ab	728.25±8.47 a	729.50±8.47 a
W 10	730.75±8.47 b	732.00±8.47 ab	733.25±8.47 ab	734.50±8.47 a	735.75±8.47 a

*Different letters within one row indicate the presence of significant differences ($p<0.05$) between the coefficients.

The mean and standard error for the FCR that treated with different levels of eggshell powder for different periods are shown in table 7. The FCR was differing significantly in most periods ($p<0.05$). In the first week to the sixth week, the FCR was the lowest in the treatment three, which was the best treatment for this trait. And for the seventh week was control the lowest, and from the eighth to the tenth the treatment five was the lowest among the other treatments. [21] record same finding when he used eggshell meal for chicken diet. But our result did not agree with the study of [18, 20, 21].

Table 7: the FCR that treated with different levels of eggshell powder for different periods

Periods	T1 Control	T2 25% Ca	T3 50% Ca	T4 75% Ca	T5 100% Ca
W 1	2.32±0.18 b	1.86±0.18 ab	1.82±0.18 a	1.86±0.18 ab	2.07±0.18 ab
W 2	2.07±0.18 b	2.22±0.18 b	1.78±0.18 a	2.10±0.18 b	2.09±0.18 b
W 3	1.97±0.18 ab	2.63±0.18 b	1.84±0.18 a	2.11±0.18 ab	2.08±0.18 ab
W 4	2.45±0.18 b	3.17±0.18 c	1.83±0.18 a	2.13±0.18 b	2.24±0.18 b
W 5	2.44±0.18 b	4.44±0.18 c	2.00±0.18 a	2.15±0.18 ab	2.13±0.18 ab
W 6	2.17±0.18 ab	2.77±0.18 b	1.96±0.18 a	2.25±0.18 ab	2.19±0.18 ab
W 7	1.91±0.18 a	2.28±0.18 b	2.06±0.18 ab	2.06±0.18 ab	2.00±0.18 ab
W 8	2.00±0.18 a	2.09±0.18 b	2.49±0.18 c	2.53±0.18 c	1.93±0.18 a
W 9	1.94±0.18 a	2.08±0.18 ab	3.11±0.18 c	2.66±0.18 b	1.93±0.18 a
W 10	1.96±0.18 a	2.11±0.18 ab	2.29±0.18 ab	2.10±0.18 b	2.05±0.18 a

*Different letters within one row indicate the presence of significant differences ($p<0.05$) between the coefficients

Conclusion

The study conducted that Adding 50% of egg shell powder to the ration of brown-laying Lohman chickens led to an improvement in the egg production characteristics represented by egg weight, feed consumption, feed conversion factor, and egg production on an HD.

References:

[1] Akinola, L. A. F., & Iyomo, E. (2018). Egg quality analysis and performance of laying hens fed different levels of calcium. *Nigerian Journal of Animal Production*, *45*(1), 172-182.

Guo, X. Y., & Kim, I. H. (2012). Impacts of limestone multi-particle size on production performance, egg shell quality, and egg quality in laying hens. *Asian-Australasian Journal of Animal Sciences*, *25*(6), 839.

[2] Vicenzi E. (1996). Fadiga de gaiola e qualidade da casca do ovo – aspectos nutricionais. In: SIMPÓSIO TÉCNICO DE PRODUÇÃO DE OVOS, 6, 1996, São Paulo, SP. Anais.São Paulo: APA, p. 77-91

[3] Rodriguez-Blanco J.D., Shaw S., & Benning L.G. (2011). The kinetics and mechanisms of amorphous calcium carbonate (ACC) crystallization to calcite, viavaterite. Nanoscale, 3:265–271

[4] Saki, A., Rahmani, A., & Yousefi, A. (2019). Calcium particle size and feeding time influence egg shell quality in laying hens. *Acta Scientiarum. Animal Sciences*, *41*.

[5] Proszkowiec-Weglarz, M., & Angel, R. (2013). Calcium and phosphorus metabolism in broilers: Effect of homeostatic mechanism on calcium and phosphorus digestibility. *Journal of Applied Poultry Research*, *22*(3), 609-627.

[6] Gilani, S., Mereu, A., Li, W., Plumstead, P. W., Angel, R., Wilks, G., & Dersjant-Li, Y. (2022). Global survey of limestone used in poultry diets: calcium content, particle size and solubility. *Journal of Applied Animal Nutrition*, *10*(1), 19-30.

[7] Baraibar, A. M., de Pascual, R., Carretero, V. J., Liccardi, N., Juárez, N. H., & Hernández-Guijo, J. M. (2023). Aluminum alters excitability by inhibiting calcium, sodium, and potassium currents in bovine chromaffin cells. *Journal of Neurochemistry*, *165*(2), 162-176.

[8] Kussakawa, K.C.K., Murakami, A.E. & Furlan, A. C. (1998). Combinations of calcium sources in diets of laying the final stage of production and after molting Brazilian Journal of Animal Science. 27 (3): 572-578

[9] Shaker, A. S., Mohammed, A. K., & Razuki, W. M. (2023). Estimation of genetic parameters for egg production traits in Japanese quail that selected for immune responses and fed different level of dietary L-arginine. *Kirkuk University Journal for Agricultural Sciences*, *14*(1), 73-81.

[10] Al-Qaisi, A., & Ameen, Q. (2023). The effect of partial or total substitution of raw or roasted domestic sesame seeds in laying hens on the qualitative qualities of eggs. *Kirkuk University Journal for Agricultural Sciences*, *14*(3), 113-122.

[11]AL-Hadeedy, I., Mohammed, A., & AL-Tikriti, S. (2023). Heritability and Genetic Correlation Between Productive and Biochemical Traits of White Japanese Quail. *Kirkuk University Journal for Agricultural Sciences*, *14*(3), 182-189.

[12] Al-Khayyat, M., & Shanoon, A. (2024). Comparison the Effect of Adding Local Anemone coronaria L. Flower Powder and Vitamin C in the diet on the Productive Performance of Laying Hens Exposed to Heat Stress in Summer. *Kirkuk University Journal for Agricultural Sciences*, ()

[13] Al-Jabari, Q. H., & Shaker, A. S. (2023). The Effect of Adding Moringa Leaf Powder to the Adapted Quail Diet During the Egg Production Stage on the Productive Performance and some Biochemical Blood Characteristics. In *IOP Conference Series: Earth and Environmental Science*, 1262(7): 072052

[14] Duncan, D. B. (1955). Multiple Range and Multiple Test. Biometrics. 11: 1-42.

[15] Lee, W. D., Kothari, D., Niu, K. M., Lim, J. M., Park, D. H., Ko, J., & Kim, S. K. (2021). Superiority of coarse eggshell as a calcium source over limestone, cockle shell, oyster shell, and fine eggshell in old laying hens. *Scientific Reports*, *11*(1), 13225.

[16] Olgun, O., Yildiz, A. Ö., & Cufadar, Y. (2015). The effects of eggshell and oyster shell supplemental as calcium sources on performance, eggshell quality and mineral excretion in laying hens. *Indian Journal of Animal Research*, *49*(2), 205-209.

[17] Gongruttananun, N. (2011). Effects of eggshell calcium on productive performance, plasma calcium, bone mineralization, and gonadal characteristics in laying hens. *Poultry science*, *90*(2), 524-529.

[18] Kismiati, S., Yuwanta, T., Zuprizal, Z., & Supadmo, S. (2012). The Physical and Chemical Characteristics of Eggshell Waste as Phosporus Fortification: its Effect on Egg Production and Eggshell Quality of Laying Hens.

[19] In *Proceedings The 1st Poultry International Seminar 2012 The Role of Poultry in Improving Human Welfare* (pp. 138-146).

[20] Islam, M. A., & Nishibori, M. (2021). Use of extruded eggshell as a calcium source substituting limestone or oyster shell in the diet of laying hens. *Veterinary Medicine and Science*, *7*(5), 1948-1958.

[21] Okpanachi, U., Yusuf, K. A., Ikubaje, M. K., & Okpanachi, G. C. A. (2021). Effects of egg shell meal on the performance and haematology of layers and their egg quality. *African Journal of Science, Technology, Innovation and Development*, *13*(1), 89-96.

تأثير إضافة مستويات مختلفة من مسحوق قشر بيض الدجاج المجفف في الصفات الانتاجية لبيض دجاج اللوهمان البياض.

عصام تحسين الداودي[1]   رشيد حسن الدلوي [2]

شعبة الإنتاج الحيواني، مديرية الزراعة، كركوك، العراق.

[2] قسم الإنتاج الحيواني، كلية الزراعة، جامعة كركوك، كركوك، العراق.

الخلاصة

أجريت هذه الدراسة في قسم الإنتاج الحيواني – كلية الزراعة – جامعة كركوك للفترة من 2023/7/24 ولغاية 2023/10/1، واستخدم فيها مائة طائر بعمر 28 اسبوع، وزعت عشوائياً على خمس معاملات، عشرون طيراً لكل معاملة، ووضعت في اقفاص انتاجية. تم توزيع الطيور من كل معاملة على خمس مكررات بواقع أربعة طيور في كل مكرر. وكانت المعاملات الخمس هي: المعاملة الاولى= 100% حجر الكلس+ 0% مسحوق قشرة البيض، المعاملة الثانية= 75% حجر الكلس + 25% مسحوق قشرة البيض، المعاملة الثالثة= 50% حجر الكلس + 50% مسحوق قشرة البيض، المعاملة الرابعة= 25% حجر الكلس + 75% مسحوق قشرة البيض، المعاملة الخامسة = 0% حجر الكلس + 100% مسحوق قشرة البيض. تم غلي قشرة البيضة، وغسلها، وتجفيفها في الشمس لمدة 3 أيام، وتكسيرها وسحقها، وخلطها مع العلف. وجدت الدراسة أن إضافة مستويات مختلفة من مسحوق قشر البيض أثر بشكل كبير على وزن البيض وعدد البيض وإنتاج البيض ومع ذلك، فقد اختلف مع الدراسات السابقة التي وجدت أن إضافة مصادر مختلفة وتركيزات مختلفة من الكالسيوم في علائق الدجاج البياض لم يؤثر بشكل كبير على انتاج البيض.

الكلمات المفتاحية : الدجاج البياض، الكالسيوم، مسحوق، قشر البيض.