Kirkuk University Journal for Agricultural Sciences
ISSN:2958-6585
https://kujas.uokirkuk.edu.iq

RESEARCH ARTICLE https://doi.org. 10.58928/ku24.15212

Effect of adding celery seeds and Alfalfa powder on Production performance, egg quality and blood biochemical traits of quail.

Mohammed A. Mohammed
Department of Animals Production, College of Agriculture, Kirkuk University, Kirkuk, IRAQ.
*Corresponding Author: Mohammed abdulraheem@uokirkuk.edu.iq.

Received: 18/02/2024 **Revised: 03/04/2024** **Accepted: 13/05/2024** **Published: 01/06/2024**

ABSTRACT

The purpose of the current study was to evaluate the effect of adding celery seeds and Alfalfa powder to the diet on the performance and some of the blood biochemical characteristics of quail birds. The study was conducted from 20/5/2022 to 19/7/2022 at the poultry field that belongs to the Animal Production Department/College of Agriculture / University of Kirkuk. The experiment contained four treatments as follows: 1) basal diet (without any addition), 2) basal diet + 3% celery seeds, 3) basal diet + 3% Alfalfa powder, 4) basal diet + 3% celery seeds + 3% Alfalfa powder. Ninety-six quail birds were randomly assigned to the four treatment diets. In addition, the treatments contained six replicates, and each replicate used four quail birds in vertical cages. At the end of the nutritional experiment (8 weeks), two birds were slaughtered from each replicate to conduct the biochemical blood test. The results showed a significant improvement in treatment four compared to the control diet in egg production and the HU unit. There were no differences in feed consumption rate, food conversion ratio, egg weight, yolk weight, white weight, shell weight, yolk height, white height, and shell thickness. The result of the biochemical blood test showed no significant differences between the experimental diets in ALT (IU/L), AST (IU/L), ALP (Unit/Lit), FSH (pg/ml), and LH (pg/ml)..

***Keywords*:** Production, Performance, Blood biochemical traits, Quail eggs, celery, Alfalfa.

INTRODUCTION

The poultry industry is considered one of the most rapidly growing agricultural sectors globally (1), especially in developing countries. The growth in the poultry industry is increasing continuously because of the increasing demand for poultry products and the population increase (2). For that reason, poultry breeders need to be precise in forming poultry diets because poultry production can be affected by infectious diseases (3,4,5). Medicinal plants or herbs are a good alternative to antibiotics used as growth stimulants for poultry (6). Celery seeds are one of the medical herbs and have been used as herbal medicine in India since ancient times. It showed anti-inflammatory properties as well as stomach protection (7). From that time, people started using celery as a vegetable on a larger scale, while the seeds have been used in medical fields since the 19th century (8). Celery seeds were used as a diuretic, treatments for colds, indigestion, and liver and spleen diseases (9). Celery contains the flavonoid compounds, 2.5-3% volatile oil, 60-70% D-Limonene, and 10-20% B-Selenin (10). Furthermore, celery seeds are considered a natural antioxidant and prevent the damage caused by fatty and amino acids' oxidation. In addition, celery works in increasing the percentage of glutathione and decreasing the malondehyde (11). The extracted active compounds from celery seed and its oil are 3-n-butylPhathalideor, Phathalide, Selinene, and also flavonoids such as Apiin, Apigenin, and Sesquiterpene. Also, the volatile fatty acids such as Palmitic and Oleic acid and Tyrosine and Glutamine (12,13). Apigenin is an isolated compound from celery seeds and has a role in preventing blood clotting and platelet aggregation in blood vessels (14). In addition, the 3-n-butylPhathalideor compound in celery has a medical effect in lowering cholesterol by its ability to prevent the B receptors in the blood vessels which cause vasodilation (15). On the other hand, Alfalfa is considered one of the richest plants with phytoestrogen ingredients such as apigenin, luteolin, and coumestrol (16). A diet that contains phytoestrogen ingredients can improve egg production and quality (17,18). Furthermore, Alfalfa contains a high percentage of fibers and is used as an additive in poultry diets as a source of xanthophyll and carotin which is responsible for the yolk color (19). Saponin is another compound in Alfalfa and plays a role in decreasing the

cholesterol in the liver (20). Adding Alfalfa to the diet can enhance the concentration of antioxidant receptors and anti-inflammatory and antivirus compounds in the intestine (21). The purpose of the study is to investigate the effect of adding celery seeds and Alfalfa powder on the performance of egg production and quality in quail birds.

Materials and Methods

The experiment was conducted using 96 local quail birds at the age of 8 weeks and was continued till 8 weeks. The birds were randomly assigned into 4 treatments and each treatment contained 6 replicates. The experiments were conducted in vertical cages with the following dimensions: 45*40*35 cm (Length, Width, Height), and each cage contained 4 female birds. The research took place in the poultry field that belongs to the College of Agriculture from 20/5/2022 to 19/7/2022. The diets were calculated based on the National Research Center (22). The experiment treatments were as follows; the control treatment was without any addition, the first treatment contained 3% celery seeds, the second treatment contained 3% Alfalfa leaves powder, and the third treatment contained 3% celery seeds plus 3% Alfalfa leaves powder. The lights were available 16 hours daily with 8 hours of darkness during the experiment. The eggs were collected daily after 12 pm, the feed was placed at 8 am daily by hand and the leftovers were weighed as well. The eggs were weighed two times a week, and Egg quality traits were measured weekly. At the end of the experiment, two birds were slaughtered from each replicate to analyze the blood biochemical characteristics. The data were analyzed using the statistical analysis system (23), and the data comparison between the mean by Duncan polynomial test (24).

Table 1. Feedstuffs percentage and chemical composition calculated of experimental diets for quail eggs according to the National Research Center.

Feedstuffs %	(Basal diet)
Ground wheat	38.00
Soybean meal 47%	31.00
Corn	21.20
Sunflower oil	3.00
Nacl	0.10
DI- calcium phosphate	0.57
limestone	5.96
Methionine	0.17
Lysine	0.00
Chemical composition calculated	
ME(Kcal/kg)	2922
CP (%)	20.74
Calcium (%)	2.4
Available P(%)	0.30
Methionine (%)	0.46
Lysine (%)	1.00

Results and Discussion

The result in Table 2 presents the effect of adding celery seeds and Alfalfa powder to the diet on the egg production (H.D%) of quail birds. The result showed no significant differences between the experimental treatments during weeks 1,2, and 4, while in week 3 the result indicated significant improvement in treatment 4 ($P \leq 0.05$) compared to the control treatment, but no differences with the other treatments. In weeks 5 and 6, treatment 4 was significantly higher ($P \leq 0.05$) than the control treatment and treatment 3, while there were no differences with treatment 2. The result of week 7 showed a significant effect in treatment 4 compared to the other treatment, while treatment 2 was significantly higher than the other treatment. The last week showed significant improvement in treatments 2 and 4 compared to the control treatment but no differences with treatment 3. When calculating the total egg production during the experimental period, we notice that the treatment 4 was significantly higher than the other experimental treatments.

Table 2. Effect of adding celery seeds and Alfalfa powder on the Production (H.D) %of quail eggs.

Production (H.D) %	T1	T2	T3	T4
Week1	79.72±1.40 a	79.91±1.54 a	79.33±1.08 a	80.50±2.02 a
Week2	80.30±1.66 a	79.33±2.33 a	79.10±1.06 a	80.88±0.38 a
Week3	79.91±1.54 b	80.50±2.03 ab	80.03±2.07 ab	81.86±1.93 a
Week4	80.50±1.03 a	81.08±2.10 a	80.61±2.12 a	81.66±1.08 a
Week5	80.03±2.76 c	82.25±2.63 ab	81.66±2.41 bc	83.80±1.18 a

Week6	79.91±2.74 c	82.25±2.30 ab	80.96±3.29 c	83.22±2.88 a
Week7	80.11±2.60 c	81.08±1.54 b	80.50±2.02 c	83.06±2.26 a
Week8	79.33±2.33 b	82.83±2.08 a	81.66±2.34 ab	82.98±2.54 a
Total production	79.97±0.12 c	81.15±0.43 b	80.48±0.33 bc	82.24±0.42 a

T1: control, T2: basal diet +3% celery seeds, T3: basal diet + 3% Alfalfa powder, and T4: basal diet + (3% celery seeds + 3% Alfalfa powder).
Mean: values in the same column with different letters are significantly different ($p \leq 0.05$).

Table 3 represents the effect of adding celery seeds and Alfalfa powder to the diet of quail birds on the egg mass. The result showed no significant differences between the treatments during weeks 1, 2, 3, 4, and 7, whereas in week 5 there was significant improvement in treatment 4 ($P \leq 0.05$) compared to the control treatment and treatment 3. In weeks 6 and 7, there was significant improvement ($P \leq 0.05$) in treatment 4 compared to the control treatment, while no differences with treatments 2 and 3.

Table 3. Effect of adding celery seeds and Alfalfa powder on the Egg mass (g day) of quail eggs.

Egg mass (g day)	T1	T2	T3	T4
Week1	9.95±0.16 a	10.17±0.18 a	9.97±0.56 a	10.30±0.16 a
Week2	9.77±0.05 a	9.70±0.32 a	9.77±0.38 a	10.24±0.13 a
Week3	10.05±0.29 a	9.94±0.54 a	9.76±0.46 a	10.10±0.43 a
Week4	9.83±0.35 a	9.90±0.24 a	9.86±0.21 a	10.04±0.10 a
Week5	9.96±0.54 b	10.11±0.49 ab	9.88±1.17 b	10.58±0.22 a
Week6	9.88±0.99 b	10.17±0.52 ab	10.00±0.39 ab	10.41±0.48 a
Week7	9.51±0.24 a	9.81±0.03 a	9.69±0.17 a	9.99±0.10 a
Week8	9.59±0.14 b	10.04±0.18 ab	10.04±0.29 ab	10.25±0.21 a
Total Egg mass	9.81±0.06 a	9.98±0.06 a	9.87±0.04 a	10.23±0.06 a

T1: control, T2: basal diet +3% celery seeds, T3: basal diet +3% Alfalfa powder, and T4: basal diet + (3% celery seeds +3% Alfalfa powder).
Mean: values in the same column with different letters are significantly different ($p \leq 0.05$)

The result in Table 4 represents the effect of adding celery seeds and Alfalfa powder on the feed intake of quail birds. The feed intake did not significantly differ between the experimental treatments in all the experimental weeks. However, there was a numerical increase in feed consumption as celery seeds and Alfalfa powder were added to the diet.

Table 4. Effect of adding celery seeds and Alfalfa powder on the Feed intake (g per day) of quail eggs.

Feed intake (g day)	T1	T2	T3	T4
Week1	28.45±0.08 a	28.47±0.01 a	28.49±0.02 a	28.58±0.01 a
Week2	28.41±0.02 a	28.45±0.09 a	28.49±0.07 a	28.48±0.04 a
Week3	28.29±0.08 a	28.30±0.02 a	28.34±0.03 a	28.43±0.05 a
Week4	28.38±0.03 a	28.43±0.03 a	28.44±0.01 a	28.47±0.03 a
Week5	28.58±0.30 a	28.29±0.02 a	29.00±0.66 a	28.77±0.30 a
Week6	28.93±0.66 a	28.34±0.01 a	28.40±0.01 a	28.75±0.28 a
Week7	28.30±0.03 a	28.35±0.02 a	28.39±0.01 a	28.44±0.02 a
Week8	28.23±0.09 a	28.62±0.31 a	28.70±0.35 a	28.39±0.10 a
Total Feed intake	28.44±0.07 a	28.40±0.03 a	28.53±0.07 a	28.53±0.05 a

T1: control, T2: basal diet +3% celery seeds, T3: basal diet +3% Alfalfa powder, and T4: basal diet + (3% celery seeds +3% Alfalfa powder).
Mean: values in the same column with different letters are significantly different ($p \leq 0.05$).

Table 5 represents the effect of adding celery seeds and Alfalfa powder on the efficiency conversion ratio of feed to quail eggs. The result showed no significant differences between the treatments in weeks 1 until week 8. However, there was a numerical improvement in the efficiency of the feed conversion ratio as celery seeds and Alfalfa powder were added to the diet. When calculating the total efficiency conversion ratio of feed during the experimental period, we notice that the treatment 4 was better compared to the other experimental treatments

Table 5. Effect of adding celery seeds and Alfalfa powder on the efficiency conversion ratio of feed to quail eggs.

FCR (g feed/g egg mass)	T1	T2	T3	T4
Week1	2.85±0.04 a	2.79±0.05 a	2.87±0.15 a	2.77±0.04 a
Week2	2.90±0.01 a	2.93±0.10 a	2.92±0.12 a	2.78±0.03 a
Week3	2.81±0.08 a	2.86±0.15 a	2.91±0.13 a	2.82±0.12 a
Week4	2.89±0.10 a	2.87±0.07 a	2.88±0.06 a	2.83±0.02 a
Week5	2.88±0.14 a	2.81±0.13 a	2.99±0.26 a	2.71±0.02 a
Week6	2.97±0.22 a	2.80±0.14 a	2.84±0.01 a	2.77±0.11 a
Week7	2.98±0.07 a	2.88±0.01 a	2.93±0.05 a	2.84±0.02 a
Week8	2.94±0.05 a	2.85±0.04 a	2.86±0.07 a	2.77±0.06 a
Total FCR	2.90±0.02 a	2.84±0.01 b	2.90±0.01 a	2.78±0.01 c

T1: control, T2: basal diet +3% celery seeds, T3: basal diet +3% Alfalfa powder, and T4: basal diet + (3% celery seeds +3% Alfalfa powder).

Mean: values in the same column with different letters are significantly different ($p \leq 0.05$).

Table results in Table 6 showed no significant differences between the treatments on the egg weight, yolk weight, and white weight during the whole experiment. The shell weight and the yolk height showed no differences between the experimental treatments during the 8 weeks of the experiment. In addition, the shell thickness did not differ from the other treatment, while the result of the HU unit showed significant improvement ($P \leq 0.05$) in treatment 4 compared to the control treatment and treatment 3.

Table 6. Effect of adding celery seeds and Alfalfa powder on egg quality in local quail.

Parameter	T1	T2	T3	T4
Egge weight(g)	11.85±0.45 a	12.17±0.07 a	12.35±0.16 a	12.62±0.37 a
Yolk weight(g)	3.53±0.18 a	3.61±0.08 a	3.49±0.04 a	3.43±0.18 a
Albumin weight(g)	6.71±0.60 a	6.96±0.03 a	7.26±0.13 a	7.50±0.26 a
Shell weight(g)	1.60±0.03 a	1.60±0.05 a	1.60±0.02 a	1.68±0.01 a
Yolk high (mm)	10.34±0.76 a	10.85±0.41 a	10.53±0.51 a	10.97±0.32 a
Albumin high (mm)	4.38±0.15 a	4.84±0.26 a	4.46±0.36 a	4.94±0.25 a
Shell thickness (mm)	0.21±0.06 a	0.21±0.01 a	0.21±0.05 a	0.21±0.03 a
Haugh unite	88.68±0.55 b	90.95±1.45 ab	88.70±2.00 b	91.15±1.48 a

T1: control, T2: basal diet +3% celery seeds, T3: basal diet +3% Alfalfa powder, and T4: basal diet + (3% celery seeds +3% Alfalfa powder).

Mean: values in the same column with different letters are significantly different ($p \leq 0.05$).

Table 7 represents the effect of adding celery seeds and Alfalfa powder on some blood biochemical characteristics. The results showed no significant differences between the treatments in LH, whereas treatment 4 showed the highest value with an average (1692.67). The FSH was not affected by the experimental treatments, while treatment 4 showed the highest value with an average (222.33). In addition, ALP, AST, and ALT were not affected by the different treatments in the experiment.

Table 5. Effect of adding celery seeds and Alfalfa powder on some blood biochemical characteristics.

Parameters	T1	T2	T3	T4
LH pg/ml	1688.33±6.00 a	1689.33±6.35 a	1688.67±6.33 a	1692.67±5.36 a
FSH pg/ml	221.00±5.56 a	221.66±5.92 a	221.33±2.72 a	222.33±6.22 a
ALP (Unit/ Lit)	441.66±5.60 a	441.33±1.85 a	441.00±1.52 a	440.66±2.84 a
AST (IU/L)	205.00±7.63 a	204.66±8.96 a	205.71±7.68 a	204.33±5.36 a
ALT (IU/L)	2.08±0.20 a	2.06±0.26 a	2.08±0.15 a	2.03±0.18 a

T1: control, T2: basal diet +3% celery seeds, T3: basal diet +3% Alfalfa powder, and T4: basal diet + (3% celery seeds +3% Alfalfa powder).

The significant differences in the productive qualities (egg production, egg mass, total FCR and HU unit) could be due to the addition of celery seeds. That is because of the compounds in celery, such as flavonols, flavones, d-limonene, and b-selinene. Those compounds are considered antioxidants and have a role in affecting the frontal lobe of the pituitary gland, especially the secretion of FSH, and LH, therefore increasing the production (25,26). Furthermore, celery contains vitamins A, B2, and B1, calcium, magnesium, phosphorus, and iron (14). On the other hand, it could be related to the Alfalfa, which contains compounds such as phytoestrogen ingredients (apigenins). Those compounds have a role in increasing egg production as well as contain carotenes which enhance the HU unit. Also, the fiber content of Alfalfa improves the

physiological function of the intestine (19, 27). The addition of Alfalfa affects the microbial cluster in the digestion system of the poultry (28). The Alfalfa powder is considered a good source of carotene and vitamin A, which in turn reduces the secretion of the hormone corticosterone in the adrenal cortex, which in turn reduces the effectiveness of protein catabolism and thus converts this percentage of protein to production, also contains high amounts of iron, 480 mg/kg, which enters In the formation of hemoglobin in the blood and then the manufacture of red blood cells. As a result, the volume of packed blood cells increases and also contains a complex vitamin B group that is important in the processes of manufacturing red cells in the bone marrow and contains large amounts of vitamin E, which has an important role in Erythrolysis, Through their action as antioxidants and protecting plasma membranes from damage caused by oxidative stress, thus preserving red blood cells and the hemoglobin that is included in their composition, which plays a positive role in increasing the size of packed blood cells(29).

Conclusion

The results from adding 3% celery seeds and 3% Alfalfa powder resulted in significant improvement in quail performance (egg production, egg mass, and HU unit) during the whole experiment. That could be related to the compounds that celery seeds contain such as flavones, flavones, and volatile oil. Those compounds are considered antioxidants and can affect the pituitary glands and the secretion of LH, and FSH, therefore increasing the production. Alfalfa, on the other hand, contains compounds such as apigenins, which play a role in increasing egg production, and HU units.

References

[1] Alkhalf, A., Alhaj, M. and Al-homidan, I. (2010) Influence of probiotic supplementation on blood parameters and growth performance in broiler chickens. Saudi J Biol Sci 17, 219–225.

[2] Mottet, A., & Tempio, G. (2017). Global poultry production: current state and future outlook and challenges. World's Poultry Science Journal, 73(2), 245-256.

[3] Diaz Carrasco, J. M., Casanova, N. A., & Fernández Miyakawa, M. E. (2019). Microbiota, gut health and chicken productivity: what is the connection? Microorganisms, 7(10), 374.

[4] Ameen, Q., Mohammed, M., Ameen, S., & Alsaadi, S. (2023). The Requirements of Chickens for Nutritional Compounds for Growth, An advanced Nutritional outlook. Kirkuk University Journal for Agricultural Sciences, 14(3), 17-33. doi: 10.58928/ku23.14303.

[5] Qadir Zangana, N. A., & Ahmed AL-Neemi, M. I. (2023). Effect of substituting synthetic methionine and lysine with herbal, with adding thyronine by 120% in low-protein diets of laying hens on productive and some blood traits. *Journal of Kirkuk University for Agricultural Sciences*, *14*(2).

[6] Metwally Moustafa, M. (2023). Impact of crushed celery seeds and cinnamon powder supplementation as natural additives on the performance, carcass parameters, some blood criteria and economic efficiency of Japanese quail. Desert and Environmental Agriculture. 3 (1): 41-61.

[7] ZHOU, Yong. (2008). An antimicrobial agent from celery seed active against H. pylori. Doctoral, Sheffield Hallam University (United Kingdom).

[8] ICBS, Inc Discussion forum, [online]. (2004) Last accessed on 17th Sep. 2004 at URL: http://www. hoslistic-online. com/discussion/

[9] Mdidea. Products [online]. (2006) Last accessed on 17th Nov. 2006 at URL: http:// www. mdidea. com/products/

[10] Wolski, T., A. Najda and M. Mardarowicz (2001). GC/MS analysis of essential oil of the fruits of three varieties of Apium graveolens L. var dulce mill. Pers. Annales Universitstis Mariae Curie Skodowska Sectio EEE, Horticultura q(Supplement), PP. 203- 211.

[11] Belewu, M.A.; Olatunde, O. A.; & Giwa, T. A. (2009). Underutilized medicinal plants and spices: Chemical composition and phytochemical properties. Journal of Medicinal Plants Research. 3(12):1099-1103.

[12] Falzari, L. & Menary. R. (2005). Development of aclery oil and extract industry. Rural industries Resarch & Development corporation., 5: 133.

[13] Hedges, J. L. & Lister, C. E. (2009). Nutritional attributes of some exotic and lesser known vegetables. New Zealand Institute for plant & Food Research Limited. 15, Pp:10-13.

[14] Safi Obeais AL-Kafajii, S. (2013). Effect of dietary supplementation of crushed seed of Celery (Apium graveolens) on Blood traits & Some Immunological parameters of broiler roosters (Hubbard flex). *journal of kerbala university*, *9*(2), 33-39.

[15] Le, Q. T., & Elliott, W. J. (1991, October). DOSE-RESPONSE RELATIONSHIP OF BLOOD-PRESSURE AND SERUM-CHOLESTEROL TO 3-NORMAL-BUTYL PHTHALIDE, A COMPONENT OF CELERY OIL. In *Clinical Research* (Vol. 39, No. 3, pp. A750-A750). 6900 GROVE RD, THOROFARE, NJ 08086: SLACK INC.

[16] Tucak, M., Horvat, D., Cupic, T., Krizmanic, G., Tomas, V., Ravlic, M., & Popovic, S. (2018). Forage legumes as sources of bioactive phytoestrogens for use in pharmaceutics: a review. *Current pharmaceutical biotechnology*, *19*(7), 537-544.

[17] Yang, J. X., Chaudhry, M. T., Yao, J. Y., Wang, S. N., Zhou, B., Wang, M., ... & Li, Y. (2018). Effects of phyto-oestrogen quercetin on productive performance, hormones, reproductive organs and apoptotic genes in laying hens. *Journal of animal physiology and animal nutrition*, *102*(2), 505-513.

[18] Saleh, A. A., Ahmed, E. A., & Ebeid, T. A. (2019). The impact of phytoestrogen source supplementation on reproductive performance, plasma profile, yolk fatty acids and antioxidative status in aged laying hens. *Reproduction in domestic animals*, *54*(6), 846-854.
[19] Yan Cui, Zipeng Diao, Wentao Fan, Jiali Wei, Jiasheng Zhou, Hongyan Zhu, Desheng Li, Longwei Guo, Yumin Tian, Hui Song & Yuhong Su (2022) Effects of dietary inclusion of alfalfa meal on laying performance, egg quality, intestinal morphology, caecal microbiota and metabolites in Zhuanghe Dagu chickens, Italian Journal of Animal Science, 21:1, 831-846, DOI: 10.1080/1828051X.2022.2067009.
[20] Francis GZ, Kerem H, Makkar P, Becker K. 2002. The biological action of saponins in animal systems: A review. Br J Nutr., 88:587-605.
[21] Francis, G., Kerem, Z., Makkar, H. P., & Becker, K. (2002). The biological action of saponins in animal systems: a review. *British journal of Nutrition*, *88*(6), 587-605.
[22] Olgun, O., & Yıldız, A. Ö. (2015). Effect of dietary alfalfa meal on performance, egg quality, egg yolk cholesterol and hatchability parameters of quail breeders. *Turkish Journal of Agriculture-Food Science and Technology*, *3*(3), 103-106.
[23] National Research Council, & Subcommittee on Poultry Nutrition. (1994). *Nutrient requirements of poultry: 1994*. National Academies Press
[24] SAS, (2001). SAS Users Guide. Statistics Version 6th ed, SAS Institute inc ; Gry , NC .
[25] DUNCAN, D.B. (1955) Multiple range and multiple F tests. Biometrics, 11: 1–42.
[26] Abbas,A.A., Shlimoon.H.J& Zaed.J.M.S.(2013). EFFECTS OF ADDING CRUSHED GINGER, CELERY SEEDS AND THEIR COMBINATIONS TO THE BROILER BREEDERS DIETS ON PERFORMANCE TRAITS AND THEIR PROGENY CHARACTERISTICS. G.J.B.B., VOL.2 (4) 563-570.
[27] Saed,Z.J.M, . Mohammed,TH.T.& Farhan,S.M.(2018). EFFECT OF GINGER AND CELERY SEEDS AS FEED ADDITIVES ON REPRODUCTIVE PERFORMANCE OF BROILER BREEDER MALES. Plant Archives Vol. 18 No. 2, pp. 1823-1829.
[28] Noori, Abdul & Jameel, Z & Saki, A & Zamani, P & Goudarzi, S. (2023). Egg yolk cholesterol, egg quality, and performance in response to copper-methionine chelates and alfalfa powder supplementation in Nick chick laying hen diets. Journal of the Indonesian Tropical Animal Agriculture. 48. 182-193.
[29] Zheng,M., Peichun,M., Xiaoxia,T., Qiang,G. &Meng,L.(2019). Effects of dietary supplementation of alfalfa meal on growth performance, carcass characteristics, meat and egg quality, and intestinal microbiota in Beijing-you chicken. Poultry Science 98:2250–2259.
[30] Abdel Latif., Khaldoun M. & Mhboba, A.M. (2007). Effect of feeding white Leghorn chickens with different levels of alfalfa powder Dried vegetables in some physiological characteristics and acquired maternal immunity of hatched chicks When temperatures rise. Journal of the Iraqi Poultry Science. (2): 143 – 158

تأثير إضافة بذور الكرفس ومسحوق الجت على الأداء الإنتاجي والنوعي للبيض وصفات الدم الكيموحيوية لطائر السمان.

محمد عبدالرحيم محمد

قسم الإنتاج الحيواني، كلية الزراعة، جامعة كركوك، كركوك، العراق.

الخلاصة

الغرض من الدراسة الحالية لبحث تأثير إضافة بذور الكرافس المطحون ومسحوق الجت الى عليقة التجربة (0.00 ، 3.0 % بذور الكرافس ، 3.0 % مسحوق الجت و 3.0% بذور كرافس + 3.0 % مسحوق الجت) على أداء الإنتاجي (انتاج البيض) والنوعي وبعض صفات الكيموحيوية الدم لطائرة السمان في حقول الدواجن لقسم الإنتاج الحيواني في كلية الزراعة جامعة كركوك من تاريخ 20/ 5/2022 الى 2022/7/19 . وزعت 96 طائر السمان عشوائياً في التجربة إلى أربعة معاملات غذائية ، 1) العلف أساسي (بدون إضافات) ، 2) العلف أساسي + 3% بذور كرافس) ، 3) العلف أساسي + 3% مسحوق الجت و 4) العلف الاساسي +3% بذور كرافس و 3% مسحوق الجت . وتم تقسيم المعاملات التغذوية الى أربعة مكررات واستخدمت في كل مكرر ستة طائر داخل اقفاص عمودية . وفي نهاية التجربة التغذوية والبالغة 8 أسابيع تم ذبح طيرين من كل مكرر لإجراء الفحوصات الكيميائية لدمها . واظهرت نتائج البحث تفوق معنوي لمعاملة الرابعة معنويا على معاملة السيطرة من ناحية انتاج البيض وكتلة البيض ووحدة هاونسفيلد ولم يجد أي اختلاف معنوي بنسبة لاستهلاك العلف ، معامل التحويل الغذائي ، الوزن البيض ، الوزن الصفار، وزن البياض ، وزن القشرة ، ارتفاع الصفار ، ارتفاع البياض وسمك القشرة . اما بنسبة لصفات الكيميائية لدم لم يكن هناك أي فروقات معنوية بين معاملات التغذوية لصفات *LH (pg/ml)* و *FSH (pg/ml)* و *ALP (Unit/ Lit)* و *AST (IU/L)* و *ALT (IU/L)*

الكلمات المفتاحية : الإنتاج، الأداء، الصفات البيوكيميائية للدم، بيض السمان، الكرفس، البرسيم.