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RESEARCH ARTICLE
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Replacing Sunflower Oil with Rice Bran Oil in Laying Hens' Diets and Its Effect on Egg Production Traits

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ABSTRACT
This experiment was conducted in the fields of Agriculture Faculty/ University of Kirkuk/ Department of Animal Production. Using 120 85-week-old Lohmann's egg-laying hens. The study aimed to evaluate the replacement of sunflower oil with rice bran oil in laying hens on the productive qualities of eggs. The distribution of the coefficients is as follows: the first treatment: basic Bush, the second: 20% substitution, the third: 40%, the fourth: 60%, the fifth: 80%, the sixth: 100% of rice bran oil instead of sunflower oil. The results of the experiment showed that the 3rd treatment was significantly (P≤0.05) higher than the 5th treatment in egg production percentage. No significant differences were recorded among all experimental treatments in egg weight. As for egg mass, the 3rd treatment was significantly (P≤0.05) higher than the 5th treatment. Regarding the feed conversion ratio, it improved in the 3rd treatment, which was the best treatment.
The results of this study note that the addition of rice bran oil to laying hens improved some production qualities, including egg production rate, egg mass and feed conversion ratio.

***Keywords*:** Egg production, Laying hens, Rice bran oil, Sunflower oil, Poultry nutrition.

INTRODUCTION

The poultry industry has undergone significant changes over recent years as a result of genetic and nutritional improvements, which have led to weight gain, production and improved feed utilization efficiency. Food energy is an important element in supporting these improvements [1]. Egg production is one of the most important products provided by laying hens, and eggs are characterized by great economic value and are a rich source of animal protein and are considered one of the basic consumer products in the world due to their low cost [2,3]. Oils play an important role in laying hens as a source of energy, providing twice as much energy as carbohydrates or proteins, improving the palatability of feed and enhancing the absorption of fat-soluble vitamins [4]. With the continuous improvement in the performance of animal production, the interest of breeders and producers in the use of vegetable oils in poultry feed has increased, making the improving of the productive and qualitative performance of eggs one of the most prominent priorities of the poultry industry to meet the diverse needs of consumers [5]. The search for alternatives to sunflower oil is a suitable option to support the sustainability of poultry production .in this context, rice bran oil is extracted from the embryo and the inner shell of the grain, where its percentage in Bran ranges between 10% and 23% [6]. Rice bran oil is characterized by a high content of microelements and antioxidants such as orisanol, tocopherols and tocotrienols [7,8,9]. Rice bran oil is also characterized by a good balance in the composition of fatty acids, as it contains a balanced ratio of monounsaturated, polyunsaturated and saturated acids [10]. Unsaturated fats provide higher metabolic energy compared to saturated fats [11,12]. Vegetable oils play an important role in improving the productive performance of laying hens [5,13]. The addition of rice bran oil also helps to improve egg production and lower the level of cholesterol in the blood

Materials and Methods:

This experiment was carried out in the fields dedicated to scientific research at the Department of Animal Production/ Faculty of Agriculture/ University of Kirkuk for a period of 98 days, including an introductory period of 14 days, starting from 22/08/2024 to 27/11/2024. In the experiment, 120 laying hens of the Lohman breed were received at the age of 85 weeks. The hens were raised in four-storey battery cages and randomly distributed over six treatments with five repetitions per treatment. each repeater contained four hens. the hens were weighed, the coefficients were fixed, and then fed to the experimental relations for 14 days as a preliminary period in order to adapt the birds to the experimental relations, before starting the actual experiment at the age of 87 weeks. The nutritional treatment were as follows: the first treatment: control and the second treatment: 20% of rice bran oil replaced sunflower oil the third treatment: 40% of rice bran oil replaced sunflower oil the fourth treatment: 60% of rice bran oil replaced sunflower oil the fifth treatment: 80% of rice bran oil replaced sunflower oil and the sixth treatment: 100% of rice bran oil replaced sunflower oil. An electronic timer was set

to provide 16 hours of light and 8 hours of darkness per day for the duration of the experiment. Rice bran oil of the Rizi type produced in Thailand was purchased from a local market in Kirkuk governorate and was mixed into the components of the food Bush for laying hens and used during the experiment period. Eggs were collected daily at 2:00 p.m. throughout the experimental period. The egg production rate was calculated using the following equation: Egg production (%) = (Number of eggs produced during 14 days / (Length of the period, 14 days × Number of birds at the end of the period)) × 100. The egg weight per replicate in the experiment was measured twice a week using a digital electronic balance with an accuracy of 0.01 g. The average egg mass produced at the end of each experimental period was calculated according to the following equation: Egg mass per bird (g) = Egg production (%) during 14 days × Average egg weight during 14 days [15]. Feed was provided to the birds at a rate of 120 g per bird per day throughout the experimental period, and it was observed that the entire amount was consumed without any residues. The feed conversion ratio (FCR) was calculated according to the following equation: Feed conversion ratio (g feed / g egg mass) = Average feed intake during 14 days / Egg mass produced during 14 days [16]. A complete randomized design was used to study the effect of treatments where the recorded data were pulled from Excel 2010 and statistically analyzed using the statistical program [17] SPSS (Statistical Package for the Social the differences between the averages were tested using the Duncan test (Duncan, 1955) at a morale level (P≤0.05) [18].

Table (1) The proportions of feed materials used in the feed.

Feed Ingredients	Percentage (%)
Crushed Wheat	15.80
Corn	43.90
Sunflower Oil	1.00
Barley	4.00
Soybean Meal 48% Crude Protein	22.30
Laymix-2.5	2.50
Methionine	0.06
Di-calcium Phosphate (DCP)	0.45
Limestone	9.54
Salt	0.20
Choline Chloride	0.25
Total	100
Calculated Chemical Composition	
Metabolizable Energy (Kcal/Kg)	2724
Energy to Protein Ratio	160.532
Protein Percentage	16.97
Lysine Percentage	1.502
Methionine	0.45
Methionine + Cysteine	0.63
Calcium	4.505
Phosphorus	0.697

Dry matter 97%, metabolic energy 297kacal/kg, metabolic energy with enzyme 3.057 kacal/kg, crude protein 6.06%, crude protein with enzyme 24.23%, lysine 2.50%, digested lysine 3.43%, methionine 5%, digested methionine 5.43%, methionine with cysteine 5%, methionine with digested Cysteine 5.69%, threonine 0%, digested threonine 0.85%, valine 0%, digested valine 0.74%, terpophane 0%, digested tryptophan 0.18%, arginine 0%, digested arginine 1.09%, calcium 22.59%, calcium with enzyme 29.63%, total phosphorus(p) 4.50%, available phosphorus(p) 11.54%, sodium 5.58%, chlorine 8.07%, vit. A 400,000 IU / kg, vit. D3 100,000 IU / kg, vit. E 1000 IU / kg, vit. K3 80.1 mg / kg, vit. B1 80 mg / Kg, filamine B2 180.8 mg / Kg, vit. B3 1.200 mg / Kg, vit. B5 360 mg / Kg, vit. B6 120 mg / Kg, vit. B12 1.000 mcg/Kg, vit. B9 30 mg / Kg, biotin 2.000 mcg/Kg, Choline Chloride 8.000 mg/Kg, choline 6.947 mg / kg, manganese 3.200 mg / kg, iron 2.000.4 mg / kg, copper 400 mg / kg, Zinc 2.400.5 mg / Kg, iodine 40.3 mg / kg, Selenium 10.8 mg / kg.
According to the chemical composition of feed ingredients as stated in the National Research Council (NRC, 1994) [19].

Results:

Table (2) shows the effect of replacing sunflower oil with rice bran oil in the diet of laying hens on egg production percentage (H.D%). No significant differences were observed among all treatments during the first, second, and third periods. As for the fourth period, the 1st, 2nd, 3rd, 4th, and 6th treatments were significantly (P≤0.05) higher than the 5th treatment. In the fifth period, the 3rd treatment was significantly (P≤0.05) higher than the 5th treatment but did not differ significantly from the other treatments. As for the sixth period, the 3rd treatment was significantly (P≤0.05) higher than the 5th treatment and did not differ significantly except with the 1st, 2nd, 4th, and 6th treatments. Regarding the general average, the 3rd treatment was significantly (P≤0.05) higher than the 5th treatment and did not differ significantly from

the other treatments.

Table (2): The effect of replacing sunflower oil with rice bran oil in the diets of laying hens on egg production percentage (H.D%) (mean ± standard error)

T	Period (Week)						
	1st period 87-89	2nd period 89-91	3rd period 91-93	4th period 93-95	5th period 95-97	6th period 97-99	General average period
1	78.21 ± 2.85	73.93 ± 2.91	73.57 ± 3.16	73.93 ± 1.84 a	67.50 ± 2.42 ab	68.93 ± 2.23 ab	72.68 ± 0.69 ab
2	76.43 ± 2.79	73.93 ± 2.08	75.00 ± 1.96	73.93 ± 4.13 a	61.43 ± 4.02 ab	67.50 ± 1.73 ab	71.37 ± 1.77 ab
3	76.79 ± 1.49	75.00 ± 2.93	76.43 ± 1.73	76.07 ± 4.32 a	68.93 ± 3.69 a	74.29 ± 1.66 a	74.58 ± 0.98 a
4	77.86 ± 2.30	73.57 ± 1.54	74.64 ± 1.64	75.36 ± 1.99 a	66.79 ± 2.86 ab	68.21 ± 2.61 ab	72.74 ± 1.53 ab
5	78.93 ± 1.54	73.57 ± 1.18	73.93 ± 1.75	60.00 ± 1.56 b	58.21 ± 3.37 b	65.71 ± 2.49 b	68.39 ± 0.80 b
6	79.64 ± 4.54	73.93 ± 3.64	80.36 ± 2.46	69.29 ± 3.72 a	65.71 ± 2.85 ab	68.57 ± 3.07 ab	72.92 ± 2.17 ab

*Different superscript letters within the same column indicate significant differences (P≤0.05) among treatments. Treatment 1: Control (basal diet). Treatment 2: Replacement of 20% of sunflower oil with rice bran oil. Treatment 3: Replacement of 40% of sunflower oil with rice bran oil. Treatment 4: Replacement of 60% of sunflower oil with rice bran oil. Treatment 5: Replacement of 80% of sunflower oil with rice bran oil. Treatment 6: Replacement of 100% of sunflower oil with rice bran oil.

Table (3) shows the effect of replacing sunflower oil with rice bran oil in the diet of laying hens on the average egg weight. The results show that there are no significant differences among all the experimental coefficients.

Table (3): The effect of replacing sunflower oil with rice bran oil in the diets of laying hens on average egg weight (mean ± standard error)

T	Period (Week)						
	1st period 87-89	2nd period 89-91	3rd period 91-93	4th period 93-95	5th period 95-97	6th period 97-99	General average period
1	62.02 ± 1.35	64.19 ± 0.98	63.54 ± 0.65	65.22 ± 0.88	64.96 ± 0.64	64.71 ± 0.36	64.11 ± 0.46
2	62.63 ± 1.37	62.31 ± 1.81	65.02 ± 1.30	66.35 ± 0.59	64.46 ± 0.92	64.06 ± 1.14	64.14 ± 0.74
3	61.85 ± 0.87	62.96 ± 1.16	63.02 ± 0.95	64.29 ± 0.88	64.02 ± 0.41	66.83 ± 2.66	63.83 ± 0.87
4	62.16 ± 0.83	63.90 ± 1.34	64.90 ± 1.40	64.67 ± 1.23	64.40 ± 0.50	65.46 ± 1.29	64.25 ± 0.71
5	62.15 ± 0.61	64.33 ± 0.77	65.33 ± 0.75	64.46 ± 0.79	63.13 ± 1.02	65.19 ± 0.97	64.10 ± 0.32
6	62.27 ± 1.47	65.73 ± 1.37	63.35 ± 1.08	64.25 ± 0.80	63.63 ± 1.11	63.85 ± 0.84	63.85 ± 0.88

Treatment 1: Control (basal diet). Treatment 2: Replacement of 20% of sunflower oil with rice bran oil. Treatment 3: Replacement of 40% of sunflower oil with rice bran oil. Treatment 4: Replacement of 60% of sunflower oil with rice bran oil. Treatment 5: Replacement of 80% of sunflower oil with rice bran oil. Treatment 6: Replacement of 100% of sunflower oil with rice bran oil.

Table (4) shows the effect of replacing sunflower oil with rice bran oil in the diet of laying hens on the average egg mass. The results showed no significant differences among the experimental treatments during the first, second, and third periods. As for the fourth period, the 1st, 2nd, 3rd, and 4th treatments were significantly (P≤0.05) higher than the 5th treatment and did not differ significantly from the 6th treatment. In the fifth period, the 3rd treatment was significantly (P≤0.05) higher than the 5th treatment without significant differences from the 1st, 2nd, 4th, and 6th treatments. As for the sixth period, the 3rd treatment was significantly (P≤0.05) higher than the 2nd, 5th, and 6th treatments and did not differ significantly from the 1st and 4th treatments. Regarding the overall mean, the 3rd treatment was significantly (P≤0.05) higher than the 5th treatment without significant differences from the other treatments.

Table (4): The effect of replacing sunflower oil with rice bran oil in the diets of laying hens on average egg mass (mean ± standard error)

T	Period (Week)						
	1st period 87-89	2nd period 89-91	3rd period 91-93	4th period 93-95	5th period 95-97	6th period 97-99	General average period
1	48.58 ± 2.39	47.44 ± 1.97	46.82 ± 2.42	48.19 ± 1.11 a	43.86 ± 1.71 ab	44.61 ± 1.52 ab	46.58 ± 0.57 ab
2	47.78 ± 1.47	46.15 ± 2.35	48.74 ± 1.47	49.10 ± 2.92 a	39.58 ± 2.63 ab	43.26 ± 1.51 b	45.77 ± 1.32 ab
3	47.49 ± 1.07	47.30 ± 2.49	48.20 ± 1.57	48.83 ± 2.48 a	44.11 ± 2.28 a	49.52 ± 1.34 a	47.57 ± 0.66 a
4	48.32 ± 0.82	46.96 ± 0.90	48.43 ± 1.44	48.75 ± 1.77 a	43.01 ± 1.89 ab	44.64 ± 1.86 ab	46.69 ± 0.80 ab
5	49.02 ± 0.66	47.32 ± 0.76	48.26 ± 0.76	38.68 ± 1.12 b	36.74 ± 2.23 b	42.84 ± 1.77 b	43.81 ± 0.56 b
6	49.38 ± 2.02	48.68 ± 2.86	50.99 ± 2.27	44.51 ± 2.41 ab	41.91 ± 2.39 ab	43.81 ± 2.14 b	46.55 ± 1.84 ab

*Different superscript letters within the same column indicate significant differences (P≤0.05) among treatments. Treatment 1: Control (basal diet). Treatment 2: Replacement of 20% of sunflower oil with rice bran oil. Treatment 3: Replacement of 40% of sunflower oil with rice bran oil. Treatment 4: Replacement of 60% of sunflower oil with rice bran oil. Treatment 5: Replacement of 80% of sunflower oil with rice bran oil. Treatment 6: Replacement of 100% of sunflower oil with rice bran oil.

Table (5) shows the effect of replacing sunflower oil with rice bran oil in the diet of laying hens on the feed conversion ratio. No significant differences were observed among the experimental treatments during the first, second, and third periods. As for the fourth period, the 1st, 2nd, 3rd, 4th, and 6th treatments improved significantly (P≤0.05) compared to the 5th treatment. In the fifth period, the 1st and 3rd treatments showed the best feed conversion ratio, improving significantly (P≤0.05) compared to the 5th treatment and not differing significantly from the 2nd, 4th, and 6th treatments. As for the sixth period, the 3rd treatment showed the best feed conversion ratio, improving significantly (P≤0.05) over the 5th treatment and not differing significantly from the 1st, 2nd, 4th, and 6th treatments. Regarding the overall mean, the feed conversion ratio improved in the 3rd treatment, which was the best, showing a significant decrease (P≤0.05) compared to the 5th treatment but not differing significantly from the other treatments.

Table (5): The effect of replacing sunflower oil with rice bran oil in the diets of laying hens on feed conversion ratio (mean ± standard error)

T	Period (Week)						
	1st period 87-89	2nd period 89-91	3rd period 91-93	4th period 93-95	5th period 95-97	6th period 97-99	General average period
1	2.50 ± 0.13	2.55 ± 0.10	2.59 ± 0.14	2.50 ± 0.06 b	2.75 ± 0.11 b	2.70 ± 0.09 ab	2.60 ± 0.03 ab
2	2.52 ± 0.08	2.63 ± 0.13	2.47 ± 0.07	2.48 ± 0.17 b	3.08 ± 0.20 ab	2.79 ± 0.10 ab	2.66 ± 0.08 ab
3	2.53 ± 0.06	2.56 ± 0.13	2.50 ± 0.08	2.48 ± 0.13 b	2.75 ± 0.13 b	2.43 ± 0.06 b	2.54 ± 0.04 b
4	2.49 ± 0.04	2.56 ± 0.05	2.49 ± 0.07	2.47 ± 0.09 b	2.81 ± 0.13 ab	2.71 ± 0.12 ab	2.59 ± 0.05 ab
5	2.45 ± 0.03	2.54 ± 0.04	2.49 ± 0.04	3.11 ± 0.09 a	3.32 ± 0.21 a	2.82 ± 0.11 a	2.79 ± 0.04 a
6	2.45 ± 0.10	2.51 ± 0.17	2.37 ± 0.11	2.73 ± 0.15 b	2.90 ± 0.17 ab	2.77 ± 0.16 ab	2.62 ± 0.11 ab

*Different superscript letters within the same column indicate significant differences (P≤0.05) among treatments. Treatment 1: Control (basal diet). Treatment 2: Replacement of 20% of sunflower oil with rice bran oil. Treatment 3: Replacement of 40% of sunflower oil with rice bran oil. Treatment 4: Replacement of 60% of sunflower oil with rice bran oil. Treatment 5: Replacement of 80% of sunflower oil with rice bran oil. Treatment 6: Replacement of 100% of sunflower oil with rice bran oil.

Discussion:

The positive benefits of rice bran oil in improving the performance of birds are probably due to the high content of the compounds orizanol, tocopherols, vitamin E, Ferulic Acid, phytic acid, lecithin and inositol in it [20,21]. The best performance may also be the result of rice bran oil due to the synergistic effects of the essential fatty acids contained in it [22,23]. The addition of oils to poultry feed may improve the absorption and digestion of lipoproteins and essential fatty acids, as well as lower energy production compared to carbohydrates and proteins [24,25]. In addition to the importance of adding oils in poultry feed, a decrease in the speed of passage of food through the gastrointestinal tract may also help to improve the absorption of food compounds and their efficient utilization [26], allowing more efficient use of nutrients from feed. The beneficial effects of essential fatty acids on egg production and weight have been documented [27]. The effect of unsaturated fatty acids on follicular growth and development can be explained by their direct role in the synthesis of steroid hormones within the ovary. This occurs through increasing the activity of enzymes involved in the steroidogenic pathway by modulating the activity of transcription factors that regulate the gene expression of these enzymes, thereby enhancing their activity within the cell and consequently stimulating the biosynthesis of sex steroid hormones in the ovarian gonads [28]. Unsaturated fatty acids also have an indirect effect on the synthesis of sex steroid hormones, which is attributed to the role of essential fatty acids such as linoleic acid and alpha-linolenic acid as precursors in prostaglandin formation. These acids are converted in the liver into long-chain polyunsaturated fatty acids, such as arachidonic acid, which undergoes hydrolysis followed by metabolism via a specific enzymatic system, leading to the formation of intermediate compounds that are converted into prostaglandin E2 by enzymes or non-enzymatically reduced to F2α. Additionally, the metabolism of arachidonic acid may produce unstable compounds such as prostaglandin I2 [29,30,31,32]. Prostaglandins play an important role in regulating the secretion of pituitary hormones such as luteinizing hormone (LH) and follicle-stimulating hormone (FSH) by stimulating the hypothalamus to release luteinizing hormone-releasing hormone (LHRH). It has been shown that injecting prostaglandins into the median eminence of the hypothalamus in pigeons leads to increased levels of LH and FSH, whereas direct injection into the pituitary gland does not cause any change in the concentrations of these hormones [33].

Conclusion:

The results of this study note that the addition of rice bran oil to laying hens improved some production qualities, including egg production rate, egg mass and feed conversion ratio.

References

[1]. Bell, D. D., & Weaver, W. D. (2007). Commercial chicken meat and egg production (5th ed.). Springer.

[2]. Applegate, E. (2000). Introduction: Nutritional and functional roles of eggs in the diet. Journal of the American College of Nutrition, 19, 495S–498S.

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

[4]. Roy, A., Haldar, S., Mondal, S., & Ghosh, T. K. (2010). Effects of supplemental exogenous emulsifier on performance, nutrient metabolism, and serum lipid profile in broiler chickens. Veterinary Medicine International, 2010, 1–9.

[5]. Gao, Z., Zhang, J., Li, F., Zheng, J., & Xu, G. (2021). Effect of oils in feed on the production performance and egg quality of laying hens. Animals, 11, 3482.

[6]. Dunford, N. T. (2019). Chemistry of rice bran oil. In Rice bran and rice bran oil (pp. 1–18). AOCS Press.

[7]. Sayre, R. N., Earl, L., Kratzer, F. H., & Saunders, R. M. (1987). Nutritional qualities of stabilized and raw rice bran for chicks. Poultry Science, 66, 3493–3497.

[8]. Kahlon, T. S., Chow, I., Chiu, M. M., Hudson, C. A., & Sayre, R. N. (1996). Cholesterol-lowering by rice bran and rice bran oil unsaponifiable matter in hamsters. Cereal Chemistry, 73, 69–71.

[9]. Sugano, M., & Tsuji, E. (1997). Rice bran oil and cholesterol metabolism. Journal of Nutrition, 127, 521–523.

[10]. Ghosh, M. (2007). Review on recent trends in rice bran oil processing. Journal of the American Oil Chemists' Society, 84, 315–324.

[11]. Crespo, N., & Esteve-Garcia, E. (2001). Dietary fatty acid profile modifies abdominal fat deposition in broiler chickens. Poultry Science, 80, 71–78.

[12]. Kang, H. K., & Kim, C. H. (2016). Effects of dietary supplementation with rice bran oil on the growth performance, blood parameters, and immune response of broiler chickens. Journal of Animal Science and Technology, 58(1), Article 12. https://doi.org/10.1186/s40781-016-0092-6

[13]. Kara, Z., & Bülbül, T. (2021). The effects of supplementing different vegetable oils in the diet of quails on growth, carcass traits and serum biochemical parameters. Kocatepe Veterinary Journal, 14, 57–64.

[14]. Kim, C. H., Park, S. B., & Kang, H. K. (2016). Effects of graded levels of rice bran oil on laying performance, blood parameters and egg yolk cholesterol in Hy-Line laying hens. Korean Journal of Poultry Science, 43(2), 89–96.
[15]. Al-Fayyadh, H. A., Saad, A. N., & Al-Hajo. (2011). Poultry Products Technology (2nd ed.). Ministry of Higher Education and Scientific Research, University of Baghdad.
[16]. Al-Zubaidi, S. S. A. (1986). Poultry management. Basrah University Press.
[17]. IBM Corp. (2011). IBM SPSS Statistics for Windows (Version 20.0). Armonk, NY: IBM Corp.
[18]. Duncan, D. B. (1955). Multiple range and multiple F tests. Biometrics, 11, 1–42.
[19]. NRC (1994). Naitonal Research Council,Nutrient Requirements of Poultry9th.
[20]. Sharma, R. D., & Rukmini, C. (1986). Rice bran oil and hypocholesterolemic in rats. Lipids, 21, 715–717.
[21]. Jo, I. H., & Choi, Y. H. (2010). Optimization of ethanol extraction of γ-oryzanol and other functional components from rice bran. Korean Journal of Food Preservation, 17, 281–289.
[22]. Rahimi, S., Kamran Azad, S., & Karimitorshizi, M. A. (2011). Omega-3 enrichment of broiler meat by using two oil seeds. Journal of Agricultural Science and Technology, 13, 353–365.
[23]. Baiao, N. C., & Lara, L. J. C. (2005). Oil and fat in broiler nutrition. Brazilian Journal of Poultry Science, 1, 129–141.
[24]. Grobas, S., Mateos, G. G., & Mendez, J. (2001). Influence of dietary linoleic acid on production and weight of eggs and egg components in young brown hens. Journal of Applied Poultry Research, 8, 177–184.
[25]. Bhonzack, C. R., Harms, R. H., Merkel, V. D., & Russell, G. B. (2002). Performance of commercial layers when fed diets with four levels of corn oil or poultry fat. Journal of Applied Poultry Research, 11, 68–76.
[26]. Latshaw, J. D. (2008). Daily energy intake of broiler chickens is altered by proximate nutrient content and form of the diet. Poultry Science, 87, 89–95.
[27]. March, B. E., & McMillan, C. (1990). Linoleic acid as a mediator of egg size. Poultry Science, 69, 634–639.
[28]. Wathes, D. C., Robert, D., Abayasekara, E., & Aitken, R. J. (2007). Polyunsaturated fatty acids in male and female reproduction. Biology of Reproduction, 77(2), 190–201.
[29]. Needleman, P., Turk, J., & Kakshik, B. A. (1986). Arachidonic acid metabolism. Annual Review of Biochemistry, 55, 69–102.
[30]. Murakami, M., & Kudo, I. (2004). Recent advances in molecular biology and physiology of the prostaglandin E2-biosynthetic pathway. Progress in Lipid Research, 43, 3–35.
[31]. Elmes, M., Tew, P., Cheng, Z., & Kirkup, S. E. (2005). Raised dietary n-6 polyunsaturated fatty acid intake increases 2-series prostaglandin production during labour in the ewe. The Journal of Physiology, 562, 583–592.
[32]. Cheng, Z., Green, L. R., & Poor, K. (2005). The effect of a diet supplemented with n-6 polyunsaturated fatty acid (PUFA), linoleic acid, on prostaglandin production in early and late pregnant ewes. Journal of Endocrinology, 184, 167–178.
[33]. Muhy Al-Din, Khair Al-Din, Waleed Hamid Youssef, & Saad Hassan Talha. (1990). Physiology of endocrine glands and reproduction in mammals and birds. University of Mosul, Higher Education Press.

احلال زيت نخالة الرز محل زيت زهرة الشمس في عليقة الدجاج البياض واثره في الصفات الإنتاجية للبيض

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

الخلاصة

تم تنفيذ هذه التجربة في حقول كلية الزراعة / جامعة كركوك/ قسم الإنتاج الحيواني. باستخدام 120 دجاجة بياضة (لوهمان) بعمر 85 أسبوع. تمت تربية الدجاجات في اقفاص بطارية وُزعت عشوائياً على ست معاملات بخمسة مكررات لكل معاملة وكل مكرر يحتوي على أربع دجاجات. هدفت الدراسة لتقييم استبدال زيت زهرة الشمس بزيت نخالة الارز في علائق الدجاج البياض على الصفات الإنتاجية للبيض. وتوزيع المعاملات كما يلي: المعاملة الأولى: العليقة الأساسية والثانية: إحلال 20% والثالثة: 40% والرابعة: 60% والخامسة: 80% والسادسة: 100% من زيت نخالة الرز بدلاً من زيت زهرة الشمس تبين نتائج التجربة ان المعاملة الثالثة تفوقت معنوياً ***(P≤0.05)*** على المعاملة الخامسة في معدل نسبة انتاج البيض. ولم تسجل فروقات معنوية بين جميع المعاملات التجربة في معدل وزن البيض. أما بالنسبة للكتلة البيضة فقد تفوقت المعاملة الثالثة معنوياً ***(P≤0.05)*** على المعاملة الخامسة. اما معامل تحويل الغذائي فقد تحسن في المعاملة الثالثة التي كانت أفضل معاملة.
يلاحظ النتائج هذه الدراسة ان اضافة زيت نخالة الارز الى علائق دجاج البياض ادت الى تحسن بعض الصفات الانتاجية منها معدل انتاج البيض وكتلة البيض ومعامل تحويل الغذائي.

الكلمات المفتاحية: إنتاج البيض، الدجاج البياض، زيت نخالة الأرز، زيت زهرة الشمس.