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Effect of additive different level Sesame oil to the diet on performance and some chemical parameters of main parts broiler train (308)

A research submitted to the Council of the Veterinary Department as part of obtaining a veterinary technical diploma

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Abstract

This study was conducted at the field of Shaqlawa college Research and Experiment Station, Erbil polytechnic University, for (49 days periods), to study the effect of adding different levels of Sesame oil to the diet on the performance of broiler strain (308) number 60 bids which divided to four groups each of group have (15 birds per replicate). A completely randomized design with factorial arrangement 2×2×2 consisted of three levels of Sesame oil with different levels (T1. 2%, T2. 4%, and T3 6%). Further group control (C) without any additive of Pomegranate peels powder the feeding trial lasted 7 weeks. The results showed that most treatment were significant with C group and have best value for live body weight and carcasses weight in T2 and T3.

Diets has been proved to enrich the proportion of polyunsatu-rated fatty acids in animal's products. In this study, the effects of different levels of sesame oil in the diets on the broiler performance, carcasses profile of 308 strain broiler were investigated. A total of 6 birds were assigned into 4 groups to receive either 1 of 4 different diets contained 0.0%, 2%, 4% and 6% sesame oil, respectively. Sample of 5 chicks obtained from each groups were assessed for slaughter and meat quality. Meat fatty acid profile was determined with gas chromatography. Results revealed that the higher levels of sesame oil in the diet decreased protein in thigh except feed conversion ratio. In addition, supplementation of sesame oil increased the general live body weight profile was not significantly different in the sesame oil fed groups, whereas, compare to control, it decreased the level of .In parallel with increasing levels of sesame oil.

Introduction

Addition of vegetable oil into broiler diet has been world widely used in order to increase absorption of fat soluble vitamin (A, D, E, K), minerals and to enhance egg production for layer hen. On the other hand, this addition is also for the seeking of production of functional nutrient enriched egg in poultry industry, in which, it is desired to reduce cholesterol concentrations in egg and meat for those consumers who need to lower their dietary cholesterol intake. It has been known that the supplementation of vegetable oil provided essential fatty acid precursor, which cannot be synthesized by animal or human. It has been proved that the supplemental oils significantly altered egg yolk lipid profiles or lipid composition ratios [1] [2]. These essential fatty acids are commonly found in some animal oils such as fish oil and vegetable oils such as sesame oil, canola oil, soybean oil etc. Sesame seed was described to have originated from Africa and it is thought to be the oldest oil seed known to man. Sesame oil is very resistant to rancidity due to the presence of natural anti-oxidants such as sesamoid, sesamin, and sesamol. It is therefore useful in increasing the shelter life of margarine and other vegetable oil products. Sesame oil is plant-derived oil rich in oleic acid (53.8%) which is a monounsaturated fatty acid [3]. However, it also contains a significant amount of linoleic (22.1%) and alpha-linoleic fatty acids. Sesame oil has been considered as a perfect balance of n-6 to n-3 polyunsaturated fatty acids (PUFAs), in which 54.68% of this ratio has been found matched human requirements. The egg yolk lipid profiles have been shown to vary depending on number of factors including genetic selection of the laying hen [4]. However, the results of genetic selection for lower cholesterol concentration in eggs also associated

with lower egg production [5]. In order to modify egg yolk cholesterol and fatty acids contents, the nutritional strategies or dietary manipulations have been carried out, in which supplementary of different dietary oils supplementation in layer diets such as flaxseed, perilla oil, fish oil, vegetable oil have given some promising effects. Addition of sesame oil was also considered in several studies because of its rich in omega-3 fatty acids [6] - [8]. As the result, this supplement increased the amount of omega-3 in the form of alpha-linoleic fatty acid in egg, animal organs and tissue [9]. In addition, it also resulted in better proportion of n-3 PUFAs [10]. The present of omega-3 in the animal diet was also believed to improve the taste of animal's products (meat and egg) [11]. However, there is still little known how different levels of sesame oil would alter egg yolk lipid profile and the composition of monounsaturated fatty acids (MUFAs) in the egg yolk. Therefore, the aim of this study was to investigate the effect of different levels of sesame oil (2.0%, 4.0% and 6.0%) in broiler diet on performance such as live body weight, feed intake, feed conversion ratio, weight of parts carcass and chemical composition of main parts (thigh and breast).

2. Literature review

2.1. Sesame oil is an aromatic oil extracted from sesame seeds and is a traditional product from the primary processing of sesame seeds, which can be used as edible oil. Sesame oil is rich in linoleic and linolenic acids as well as high amounts of biologically active substances such as lignans, natural vitamin E, and phytosterols [12]. The quality and nutritional content of the oil obtained from sesame seeds by cold pressing is high. The main unsaturated fatty acid in sesame oil is linoleic acid (46.9%), followed by oleic acid (37.4%). These fatty acids are essential fatty acids, because they cannot be synthesized in the organism and must be obtained through the diet. In addition, sesame oil is rich in vitamin E, which is dominated by gamma-tocopherol (90.5%) [84].

According to the Chinese Food Composition Table (2015), the average content of unsaturated fatty acids in sesame oil is 74.59%, while the average content of unsaturated fatty acids in olive oil is about 80%, which are very close to each other. Sesame oil is richer in flavor substances than olive oil. Therefore, it is more in line with the traditional dietary habits of Chinese consumers. In addition, sesame oil is commercially available at a much lower price than olive oil, making it more cost-effective [13].

In addition to the traditional water substitution, pressing, leaching, and filtering methods, the processing of sesame oil includes supercritical CO2 extraction, subcritical low-temperature extraction, microwave-assisted extraction, hydro enzymatic, and alkaline extraction methods. Some experiments have shown that sesame oil has anti-inflammatory, anti-swelling, and emollient effects, maintains capillary patency, and promotes

inflammatory skin repair [85].

2.2. Sesame Meal

The extraction of sesame oil leads to the production of a defatted by-product, sesame meal. This residue can be ground into a powder and used in cooking, thus bringing added value to the food industry. It contains a balanced amino acid composition of proteins, dietary fiber, and important bioactive compounds with antioxidant activity and health-promoting effects, such as lignans, mainly sesamin triglucoside and sesamin diglucoside [14].

The analysis of pressed sesame seed cake showed a high fiber content. As a prebiotic, it has several benefits for the stimulation of the gastrointestinal microbiota [15]. The positive regulation of the microbiota beneficially affects the host organism by promoting normal digestive function and defense against pathogens. In addition, soluble fiber forms a sticky layer in the small intestine that contributes to increase satiety. As nutrients reach further into the distal colon, the large amounts of nutrients exposed in the intestinal wall are reduced, leading to appetite hormonal changes that may contribute to weight loss [16].

2.3. Processed Foods Related to Sesame

In recent years, there has been more and more research on the process of sesame compounding products. While retaining the flavor of sesame itself, sesame is processed with other raw materials to improve the nutritional value of the product, which can meet the needs of different consumer groups. Most of the more common sesame compounding products combine sesame with beans, grains, nuts, fruits, and vegetables. Process studies combining black sesame with yams, red dates, soybeans, and peanuts to make different kinds of compound beverages are also well established [17]. These compounding products have greatly diversified the sesame product range and contributed to the development of the sesame consumer market.

Due to the high nutritional value and balanced nutritional composition of

sesame protein isolate, the addition of sesame protein isolate to food products can improve the nutritional quality of wheat-based bakery products. Researchers added different levels of sesame protein isolate to wheat flour to improve the protein content of wheat flour muffins. The nutritional quality of the muffins was improved by the addition of sesame protein isolate. The muffin with 15% sesame protein isolate was considered to be the best by professional judges in all aspects of taste and color [18].

Sesame protein isolates extracted by aqueous solution technology can be used as food ingredients, especially as thickeners, binders, and ingredients for baked goods [19].

Sesame oil, when combined with other vegetable oils, produces a blend with a good balance of essential fatty acids that can be used to produce healthy fat products [20]. Chia oil and sesame oil are important sources of essential fatty acids. However, when used alone, their ratio of omega-3 to omega-6 does not meet nutritional recommendations. Mixing these two different oils can improve this ratio to achieve balanced nutrition. In addition, the mixture of kiwi and sesame oils has a very stable physicochemical profile and has good antioxidant properties [21].

Sesame oil is rich in polyunsaturated fatty acids and can be used to make margarine. In addition, a blend of palm stearin and sesame oil can produce trans-fat-free baking ghee, which can be used in all-purpose ghee, liquid bread ghee, and pie crust ghee [22].

In terms of their healthful effects, vegetable oils are an important part of the human diet [23]. The phenolic composition, quality characteristics, and potentially beneficial properties of sesame seed oil make sesame a good health product [24]. Reported activities of sesame lignans include modulation of fatty acid metabolites, inhibition of cholesterol absorption and biosynthesis, antioxidant and protective vitamin E effects, hypotensive effects, improvement of liver function related to alcohol metabolism, and

anti-aging effects. These beneficial activities may enable the use of lignans in functional health foods [25].

3. Material and Methods

3.1. Chicks experiment. A total of 60 chicks, one -wk.-old broiler strain (308) were divided into 4 dietary groups with four replicates per group (15 birds per replicate). A completely randomized design with factorial arrangement 2×2×2 consisted of three levels of Sesame oil levels (T1. 2%, T2. 4%, and T3 6%). Further group control (C) without any additive of Sesame oil, the feeding trial lasted 7 weeks.

3.2. Housing management

Chickens are housed in the experimental hall of Shaqlawa technical college –veterinary department procedure under the same technological conditions. Viewed climatic variables must meet the criteria for the type and category of animals. Other technology systems (ventilation, lighting intensity, length of day light) (Picture. 1, 2, 3, 4)

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were implemented as recommended by the fattening technology applicable to a particular hybrid chicken included in the experiment. The trial completed at 49 days old chicken within two months of the completion of the biological tests.

Broiler chickens were kept under the Ross recommended procedure. Water and rations distributed ad libitum and uniform light provide 24 hours daily. The temperatures of the house and vaccination programme applying are basing on broiler live breeding period raisers' recommendations.

Chickens in the course of the trial were housed on the deep litter in the same technological conditions. Microclimate indicators in the range of temperature and humidity were measured and recorded three times a day, at 7.00 am, 12.00 and 17.00 pm (Pic. 3). Measurement indicated in the zone of animals, in the height from the floor, where the largest part of the body of animals.

3.3.Feed formula

Feed formula for starter and finisher in table 1 and 2

Table 1: Formula of starter feed mixture Components				
Groups				
%				
Attribute	C	T1	T2	T3
Maize	48.50	48.50	48.50	48.50
Soybean meal	29.00	29.00	29.00	30.00
Wheat	11.5	11.00	11.00	12.00
Fishmeal	4.00	4.00	4.00	4.00
Limeston($CaCo_3$)	1.30	1.30	1.30	1.30
monocalcum phosphate	0.85	0.85	0.85	0.85
*PX BR Unit	1.00	1.00	1.00	1.00
Methionen 99%	0.05	0.05	0.05	0.05
Total salt	0.22	0.22	0.22	0.22
lysine	0.03	0.03	0.03	0.03
Therionine 99 %	0.05	0.05	0.05	0.05
Sesame oil	0	2	4	6
Sunflower oil	4	2	0	0
Total	100.00	100.00	100.00	100.00

Table 2: Formula of finisher feed mixture Components				
Groups				
%				
Attribute	C	T1	T2	T3
Maize	40.50	40.50	48.50	40.50
Soybean meal	20.0	20.00	20.00	20.00
Wheat	28.0	28.0	28.0	26.0
Fishmeal	4.00	4.00	4.00	4.00
Limeston($CaCo_3$)	1.30	1.30	1.30	1.30
monocalcum phosphate	0.85	0.85	0.85	0.85
*PX BR Unit	1.00	1.00	1.00	1.00
Methionen 99%	0.05	0.05	0.05	0.05

Total salt	0.22	0.22	0.22	0.22
lysine	0.03	0.03	0.03	0.03
Therionine 99 %	0.05	0.05	0.05	0.05
Sesame oil	0	2	4	6
Sunflower oil	4	2	0	0
Total	100.00	100.00	100.00	100.00

*vit. A=4,500,000 IU, vit. D=1,660,000 IU, vit. E=20,000 mg.kg-1, K3=1, mg.kg-1, vit. B1=1,800 mg.kg-1, vit. B2=2,500 mg. vit. B6=1,600 mg.kg-1, vit. B12=8.75 mg.kg-1, folic acid=600 mg.kg-calcium pentonite=5,500 mg.kg-1, niacinamid=18,000 mg.kg-1, biotin=60 mg cholin clorid=30,000 mg.kg-1, betain=65,000 mg.kg-1, cobalt=150 mg.kg-1, Iodine=380 mg.kg-1, Mn=45,800 mg.kg-1, cupper=6,500 mg.kg-1, Si=110 mg.kg-1, Zn=28,300 mg.kg-1, Fe=27,200mg.kg-1, Mo=350 mg.kg-1.

3.4.Experimental parameters

3.4.1. Body weight

Body weight was determined by weighing individual chickens overnight at age of 49 days (picture 5) with an accuracy of ± 5 grams. Initial body weights were similar among groups, prior to diet allocation (average = 41 g/bird).

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3.4.2. Daily weight gain

It was calculated in grams (g) by dividing the living body weight gained, in feeding period, by the number of the days. It was calculated on days 49.

3.4.3. Daily feed consumption

It was recorded at the end of the feeding periods and the daily consumption was calculated by dividing total feed consumed on the number of the days

each period. It was calculated on days 49.

3.4.4. Feed Conversion Ratio

The chickens were inspected daily and dead birds were removed following registration of date and body weight. Feed Conversion Ratio (FCR) was calculated as the BWG (g) per FI (g). When calculating FCR, the body weights of dead birds were also considered. It was calculated on days 49.

3.4.5. Protein intake and protein efficiency ratio

Values of Protein Intake (PI) and Protein Efficiency Ratio (PER) of dietary treatments were calculated by using the following formula:

PI (g) = Percentage of protein in diet × FI (g)

FI= feed intake

PER (g) = BWG (g)/ PI (g)

All above farm parameter calculated of 200 birds for each treatment.

3.4.6. Slaughter outputs

The heart and liver were immediately removed from hot carcasses, packed in plastic bags (Picture. 6) and stored in liquid nitrogen until the time of analysis. After removal of the heart and liver, carcasses were chilled to 4°C, and the abdominal fat pad (from the proventriculus surrounding the gizzard down to the cloaca) was removed and weighed (Cahaner and Nitsan, 1985). At the end of the experimental period (49 days old), one chicken from each replicate of treatments group (similar body weight) was slaughtered to determine the relative weight of the following parts (All laboratory parameters token 15 bids as sampling for each treatment). **a**. The hot carcass weight. **b**. The breast. **c**. The legs. **d**. Thighs**. e**. The drumstick. **f.** The back half. **g**. Wings. **h**. Abdominal fat. **i**. The gizzard. **j**. The heart. **k**. The Liver. **l**. Feathers (Picture 7).

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3.4.7. Meat quality

The basic chemical analysis of the muscles was determined and represented in percentage in the meat represented in g.kg.-1

3.5. Determination of chemical contain in meat

3.5.1. Determination of crude fat methyl esters (FAME)

Total fat content of meat and liver was determined by application of ISO-11085 (2008) standard method. The brief procedure of crude fat analysis was explained in the appendix.

3.5.2. Determination of total ash

Total ash was determined by application of ISO 5984 (2002) standard method. Each of calcium, phosphor and magnesium minerals were determined as described in ISO 27085 (2009) standard method.

3.5.3. Basic nutrients determination in the meat

Dry matter (DM) determined by using the thermal method (105oC) acc to Slovak Standard method ISO 1442 (2000). The crude protein content (CP) determined by using the Kjeldahl method, acc. Depend on Slovak Standard method 75/A-04018 (1975). Crude fat (CF) by the Soxhlet method (Picture. 8.). Acc. to Standard method ISO 1444 (2000). Crude ash (CA) acc. to Standard PN-72/A-82245.

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3.6. Statistical analysis. For the statistical design and data analyses, complete random design of experiment with 4 treatments was determined. Data in all experiments were subjected to ANOVA procedures appropriate for a completely randomized design and the significance of differences between the means estimated using Duncan test (Duncan's new multiple range test). Probability level of $P<0.05$ was considered for Significance in all comparisons except with chemical parameters which $P<0.01$ was considered. Values in percentage were subjected to transformation. All statistical analyses were performed using the software SPSS 23.1 for Windows® (SPSS Inc., Chicago, IL).

4. Result and discussion

4.1 Effect of different dietary treatments with different level of Sesame oil on performance weight (g. day-1) of birds.

Table 3 Effect of different dietary treatments with different level of Sesame oil on performance weight (g. day-1) of birds

Treatment	Initial weight	Final weight	Weight access	Daily weight access	Feed consumption	F.C.R
C	44.88± 0.85	3492.23±10.41a	3447.35±9.99a	82.07±0.24a	7858.41±472.28a	2.25± 0.12
T1	45.83± 0.75	2543.90±11.38c	2498.53±11.75c	59.49±0.27c	4707.27±348.84c	1.85± 0.13b
T2	44.83± 0.79	3468.40±40.58a	3443.83±24.75a	81.10±0.59a	4460.10±514.27c	1.28± 0.30c
T3	45.05± 1.01	3157.10±10.99b	3112.05±10.17b	74.42±0.24b	6543.06±542.97b	2.07± 0.17b

a,b means with different superscript within row are significantly different (P< 0.05) and values will increase from (d)to (a)value. Values mean ±S.D. Standered Devetion of 15 birds.

From table 3 we noticed that insignificant (P≥0.05) for initial weight because we chose similar weight from hatching manufactory, at the end of experiment table observed that significant (P≤0.05) among treatment C and T2 insignificant because they have same level of oil in diet and equal energy but insignificant with T1and T3. Best value was in T1 this is may be related with fact of nature oil (sunflower oil) this also reflected on weight access, daily weight access, feed consuming so the result of F.C.R be same, also this is obviously due to increasing of feed required for maintenance and production especially advantage of age for general broiler strain. This is may be attributed to the decreasing of palatability of the diet due to the mixing of type fats which giving bitterness test and in to be depress to the diet [27]. [28] who reported that, supplementing of broiler diets with different level types of fat has different effects on feed consumption there results fluctuated between different groups, and the same is found in this study. [29] explain thus less availability of essential nutrients when they using full fat soybean in broiler diet. At this period the growth of bile salt gland not well growth and chicks cannot at the first week metabolic of saturated fat, this leads to less of fat metabolic in body and reflect on FCR.

4.2 Effect of Sesame oil on carcass, main and secondary parts of

chicks

The composition of the broiler carcass is now receiving considerable attention with the poultry industry's major trust in further processing. Today the trend is towards specialized carcass types and composition to meet specific demands for cut-up, deboning, and subsequent new product manufacture. Carcass composition can, to a large extent, be modified through diet choice [30] Obtained data on slaughter outputs are presented in table 4 observed that significant ($P \leq 0.05$) among all treatments for weight carcass the best value fact in control and this harmonic clear on main parts of carcass while T1 is more value than C for breast followed by C treatment. Best value for secondary parts were in (T1and T2, T1, T3, C, T1 and T2) for (Leg, wings, back, neck, head) respectively. Results observed that there were relationship between live body weight and carcasses weight in one hand, and on other hand quialty and quiantity of carcasses weight with chemical compassion reflected by type of fat utilization in diet [31]

Table 4. Effect of different dietary treatments with different level of Sesame oil on carcasses, main and secondary parts weight (g. day-1) of birds

Treatment	Carcass without head	Breast	Thigh	leg	Wing	Back	Neck	head
C	3018.48±9.63 a	1209.25±7.04b	794.78±3.81a	82.75±18.48 b	234.50±1.29 b	523.25±1.71b	110.00±0.82 a	64.00±1.83 b
T1	2108.90±11.90d	557.50±5.07d	478.50±5.80 d	140.50±1.29a	389.00±1.83a	452.25±2.63c	88.00±2.18c	122.75±2.21a
T2	2980.85±26.05b	1362.25±4.25 a	690.50±1.29 b	134.50±1.29 a	221.13±1.31c	451.75±2.22c	90.98±1.18b	124.50±1.29a
T3	2660.35±10.51c	982.25±8.42 c	625.75±2.99 c	85.50±1.29 b	216.25±2.63d	639.50±1.29 a	71.75±1.71 d	122.50±1.29a

a,b means with different superscript within row are significantly different (P< 0.05) and values will increase from (d)to (a)value. Values mean ±S.D. Standered Devetion of 15 birds.

4.3 Effect of Sesame oil on carcass, with, without edible and edible parts of chicks

Table 5. Effect of different dietary treatments with different level of Sesame oil on carcasses, with, without edible and edible parts of chicks (g. day-1) of birds

Treatment	Carcass with edible	Carcass without edible	Edible	liver	Heart	gizzard
C	3018.48±9.63 a	2871.77±6.34a	146.70±3.44b	82.75±18.48 b	72.38±2.29 b	15.15±0.13b
T1	2108.90±11.90d	1961.25±12.42d	145.1.35±1.04 b	140.1.29±1.03 a	60.20±0.18b	24.70±1.01a
T2	2980.85±26.05b	2817.10±27.14b	163.75±1.50 a	134.50±1.29 a	105.25±1.26 a	25.00±2.16a
T3	2660.35±10.51c	2535.50±11.70c	124.85±4.95c	85.50±1.29 b	60.10±0.18 b	24..75±4.80a

a,b means with different superscript within row are significantly different (P< 0.05) and values will increase from (d)to (a)value. Values mean ±S.D. Standered Devetion of 15 birds.

Table 5 observed that same significantly between carcass with and without edible parts highest value for (edible, liver, heart and gizzard) were in T2,T2 and T1, T2, T1and T2) respectively.

4.4. Effect of Sesame oil on chemical contain of breast

Table 6. Effect of Sesame oil on chemical contain of breast

Treatments	Moisture%	%Ash	Protein%	Fat%
C	73.40±0.04 a	1.09±0.05 c	17.63±0.12 c	5.83±0.05 a
T1	73.24±0.03 a	1.11±0.08 bc	18.01±0.07 b	5.43±0.05 b
T2	72.47±0.16 b	1.13±0.09ab	18.04±0.10 b	5.13±0.05 c
T3	69.07±0.06 c	1.13±0.09a	20.30±0.10 a	4.71±0.10 d

a,b means with different superscript within row are significantly different (P< 0.05) and values will increase from (d)to (a)value. Values mean ±S.D. Standered Devetion of 15 birds.

Table 6 observed that insignificant (P≥0.05) for moisture between C and T1 but both significant (P≤0.05) with T2 and T3 while significant between them, the highest value found in C and T1. These result reflect on percentage of Ash because opposite relation between percentage of moisture and percentage of Ash. Also opposite relationship between % protein and % fat, for protein insignificant between T1 and T2 but both significant with C and T3, the highest value clear in T3 opposite for % Fat lowest value T3 in % fat was significant with all remain treatments. The process of this type FA ability to change the link to the sites associated with bonds so-called conjugated FA lead to composition of chemical circles of trans-cis that make complex installation this type of FA prevent or inhibit coenzymes to link for the purpose of peptides series form of amino acids such as lysine and methionin. This inhabitation factor leads to non-regular of liver's process to combination of protein from simple and poly peptides and as a result reflected on growth birds [32]

4.5. Effect of Sesame oil on chemical contain of Thigh

Table 7. Effect of Sesame oil on chemical contain of Thigh

Treatments	Moisture%	%Ash	Protein%	Fat%
C	73.09±0.01a	1.09±0.01a	16.23±0.12 c	6.66±0.49
T1	73.29±0.44a	1.10±0.01a	16.64±0.18 b	6.95±0.49
T2	51.19±0.71b	1.01±0.02 b	17.26±0.05 a	6.96±0.10
T3	71.29±0.05a	1.07±0.03a	17.04±0.07 a	6.98±0.15

a,b means with different superscript within row are significantly different (P< 0.05) and values will increase from (d)to (a)value. Values mean ±S.D. Standered Devetion of 15 birds.

Table 7. observed that significant for % moisture by T2 compared with all another treatments which they are insignificant between them, high value was observed in T1.these results harmonic with percentage of Ash because concentrated of fat in thigh more than in breast .percentage of protein in thigh lower than in breast but concentrate of fat more than in thigh this attribute with nature of tissue in fat storage more fat. Table also impact that insignificant between T2 and T 3 on one hand on another hand significant with C and T1 which the significant between them, the high value observed in T2, for fat detected insignificant among all treatments, the high value observed in T3.

5. Conclusion and recommendation

5.1 conclusion

According to the results obtained we can concluded that

1. Utilization of Sesame oil improved of live body weight and followed for carcasses especially in percentage 4%.
2. The feed conversion ratio bette r in all treatment but also best in T2.
3. Utilization of sesame oil increase the appetite of broiler.

5.2 Recommendation

1. Right is very coast oil but we advise not to use as commercial.
2. It can be mixed with other type cheap oil or saturated fat for one side less the coast and improve properties of other cheap oil.
3. Make more experiment with different level and with fact on layer hen to find effect on egg production.

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پوختە

ئەم توێژینەوەیە لە بواری کۆلێژی شەقڵاوە وێستگەی توێژینەوە و تاقیکردنەوە، زانکۆی پۆلیتەکنیکی هەولێر، بۆ ماوەی (٤٩ ڕۆژ) ئەنجامدراوە، بۆ لێکۆڵینەوە لە کاریگەری زیادکردنی ئاستی جیاواز لە زەیتی کونجی بۆ خۆراک لەسەر ئەدای گۆشتی گۆشتی جۆری (٣٠٨) ژمارە (٣٠٨) 60 پێشنیار کە دابەشکراون بۆ چوار گروپ هەر گروپێک (15 باڵندە بۆ هەر دووبارەکردنەوەیەک). دیزاینێکی تەواو هەڕەمەکی بە ڕێکخستنی فاکتەری 2×2×2 پێکهاتبوو لە کۆنترۆڵی گروپی .(T3 6% ، و%T2. 4، %T1. 2) سێ ئاستی زەیتی کونجی بە ئاستی جیاواز بەبێ هیچ زیادکردنێک لە تۆزی تۆێکڵی هەنار تاقیکردنەوەی خۆراکدان 7 هەفتەی (C) زیاتر گرنگ بوون و C خایاند. ئەنجامەکان دەریانخست کە زۆربەی چارەسەرەکان لەگەڵ گروپی T3. و T2 باشترین بەهایان هەیە بۆ کێشی جەستەی زیندوو و کێشی تەرمەکان لە سەلمێنراوە کە خۆراکەکان ڕێژەی ترشە چەوربیە فرە نەتێرەکان لە بەر هەمەکانی ئاژەڵدا دەوڵەمەند دەکات. لەم لێکۆڵینەوەیەدا، کاریگەرییەکانی ئاستی جیاوازی زەیتی کونجی لە خۆراکەکاندا لەسەر ئەدای گۆشتی گۆشت، پرۆفایلی تەرمەکانی گۆشتی گۆشتی 308 جۆری لێکۆڵینەوەیان لەسەر کرا. سەرجەم 6 باڵندە دابەشکران بۆ 4 گروپ بۆ وەرگرتنی یان 1 لە 4 خۆراکی جیاواز کە بە ڕێککەوت 0.0%، 2%، 4% و 6% زەیتی کونجی تێدابوو. نمونەی 5 جوجکە کە لە هەر گروپێک وەرگیراون بۆ سەربڕین و کوالیتی گۆشت هەڵسەنگێندرا. پرۆفایلی ترشی چەوری گۆشت بە کرۆماتۆگرافی گازی دیاریکرا. ئەنجامەکان دەریانخستووە کە ئاستی بەرزی زەیتی کونجی لە خۆراکدا پرۆتینی لە ڕاندا کەمکردووەتەوە جگە لە ڕێژەی گۆڕینی خۆراک. سەرەڕای ئەوەش، تەواوکەری زەیتی کونجی زیاد دەکات پرۆفایلی گشتی کێشی جەستەی زیندوو

جیاوازییەکی بەرچاوی نەبوو لە گروپەکانی خۆراکدانی زەیتی کونجی، لە کاتێکدا، بە بەراورد لەگەڵ کۆنترۆڵ، ئاستی .بە هاوتەریب لەگەڵ زیادبوونی ئاستی زەیتی کونجی کەمکردەوە.