Supplementation Nigella sativa seeds and Thymus vulgaris leaves powder in broiler diet and effect on chemical composition of main carcass parts

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Abstract:

This work done in farm kosh Taba closed Erbil city from 20/4/2016till 25/5/2016. Aimed this experiment to seeking effect of supplemented Individual and combining powders of Nigella sativa and Thymus vulgaris leaves. A total number of 200 one day old straight run broiler (Ross-308 hybrid) chicks were divided to four dietary treatments each of treatment with 5 replicate, each of replicate has 10 chicks, the control group (C) without any supplement sources treatment one (T1) supplement 0.50 % of powder Nigella sativa seeds, treatment two (T2) supplement 0.50 % of Thymus vulgaris, treatment three (T3) supplement mixing of 0.25% powder Nigella sativa seeds and 0.25% of Thymus vulgaris both. This study focused on effect supplement two type of herbs on determination of chemical composition for main carcasses parts muscle (breast and thigh). Results observed significant ($P \leq 0.01$) among all treatment. High value for moisture, protein, fat and total cholesterol was in T3, T2, C and C respectively, while insignificant ($P \geq 0.01$) among all treatments for Ash. For thigh with same parameters results observed significant ($P \leq 0.01$) with all treatment high value for moisture, protein, fat and total cholesterol was in [T1, T2, C and C, T3 respectively, while insignificant ($P \geq 0.01$) among all treatments for Ash.

Key words: ***Nigella sativa, Thymus vulgaris*, Broiler Ross-308 and main carcasses broiler parts**

اضافة مطحون الحبة السوداء واوراق الزعتر وتاثيره على قياسات التركيب الكيميائي لاجزاء الذبيحة الرئيسية لفروج اللحم نوع (روز 308)

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مدرس

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المستخلص:

اجريت هذه الدراسة في احد حقول تربية الدجاج الاهلية في ناحية قوش تبه / محافظة اربيل/ كردستان العراق للفترة من 2016/4/20 الى 2016/5/25 لدراسة تأثير اضافة بشكل منفرد او ممزوج من مطحون الحبة السوداء و اوراق الزعتر. استخدمت 200 فرخة من سلالة (روز 308) الهجين وزعت باربع معاملات تغذوية لكل معاملة 5 مكررات ولكل مكرر 10 فرخات،معاملة الكونترول (C) كانت بدون اي اضافة من مصادرالبذور ، المعاملة الاولى (T1) تم اضافة 0.50 % من مطحون الحبة السوداء ، المعاملة الثانية (T2)

تم اضافة 0.50 % من الزعتر، اما المعاملة الثالثة فتتكون من خليط بنسب و 0.25 % و 0.25 % لمعاملتي T1+T2. تركزت هذه الدراسة بتاثير استخدام نوعان من الاعشاب (الحبة السوداء والزعتر) على تقديرات التراكيب الكيميائية لاجزاء الذبيحة الرئيسية لعضلتي الصدر والفخذ اظهرت النتائج فروقات معنوية ($P\leq0.01$) بين كل المعاملات.اعلى قيمة للصدر لكل من الرطوبة والبروتين والدهن والكوليسترول كانت في المعاملة الثالثة والمعاملة الثانية ومعاملة السيطرة على التوالي بينما غير معنوية ($P\geq0.01$) للرماد لكل المعاملات اما بالنسبة للفخذ ولنفس القياسات اعلى قيمة كانت المعاملة الاولى والمعاملة الثانية ومعاملة السيطرة والمعاملة الثالثة على التوالي وكذلك غير معنوية ($P\geq0.01$) للرماد ولجميع المعاملات .

Introduction:

Among such animal proteins sources, the poultry animals have a significant place due to numerous advantages contained. In the last years, it has been observed in the poultry breeding (16). The poultry industry has, in recent times, made significant contributions to the world of agricultural economy. (14). Chemical compositions of main carcasses (breast and thigh) muscle. A technical advance in the poultry industry has been accompanied by a significant exacerbated in the size of disease problems. Most workers in this field towards the use of chemical drugs, including antibiotics and live body growth promoters which results in accumulation in the tissues of birds and their body members influence on the health of consumers of eggs and meat from those poultry, and in order to avoid the adverse effects of these drugs attracted attention in recent times to use some medicinal plants or extracts in the poultry industry after that it has been scientifically proven effective in treating the effects of many of the diseases that infect humans and animals including birds (5). Most poultry diseases can reduce the spread and assist in the treatment by using herbs and medicinal plants (5), Nigella sativa seed is small in size, a dicotyledon and has one of many slang names of the herb Nigella-sativa which attributes to the botanical family of Ranunculacease. Other colloquial names for Nigella sativa involve: Black cumin, kalonji, black caraway, iranian black cumin, habbat ulbarakah, seed of blessing (Habatul-barakah in Arabic countries), Al Habbah Al Sawda, qazheshuniz and probably some else (1and27). The black seed is a herb, which had been used as a natural medication for lot of diseases for over 2000 years. Black seed have an important position in the prophetic medicine of the Prophet Mohammad (PBUH). Black seed is described as the curative black cumin in the Holy Bible and is explained as Melanthion by Hippocrates and Dioscorides and as Gith by Pliny (4,22,28). The origin of black seed is Eastern Europe, South Europe, East Mediterranean, Southern Mediterranean basin, Western Asia and Asia minor. In the Middle East, North Africa, Far East Iran, Pakistan and in the Indian subcontinent the seed dry powder or extract of Nigella sativa Linn. Black cumin seeds were used widely against variety of health disorders including bronchial asthma, allergy, lung inflammation, respiratory distress, dysentery, dyslipidaemia, microbial infections, headache, obesity, back pain, hypertension, immune disorders,

neurological disorders, skin ailments and gastrointestinal problems (3, 12 ,23 and 25). Furthermore, in the black seed oil, the content of polyunsaturated fatty acids represents double than the normal mono-unsaturated fatty acids, which helps in reducing the total cholesterol content. This plant is grown particularly in Burdur, Afyon, Karaman, Isparta and Konya localities in Turkey (9 and 8). Nigella sativa seed contains 210 g kg–1protein, 350-380 g kg–1 oil and 350 g kg–1 carbohydrate. The weight of 1000 seeds is about 2-3 g. The seed efficiency varies between 75-150 kg day–1 depending on soil, climate and cultivation conditions [8]. The seeds of black cumin are mainly used for medicinal purposes and could be used as food spice, condiment and nutritional supplements as well due to their bitter peppery taste and characteristic aroma (15). The oil obtained from cumin seeds is enriched with nutritive values but still market share in economic contribution is less significant due to certain spirituous reasons of its mention in sacred texts and describing its presence in Tutankhamen tomb (20 and 11). There is evidence to suggest that medicinal herbs, spices and various plant extract have appetite and digestion-stimulating properties and antimicrobial effects (Jain et al.,2008). Mixed medicinal herbs powder Thyme, Echinaceae and Garlic affected due to a greater efficiency in the utilization of feed, resulting in enhanced bird's performance (growth, thyme reduced feed intake and FCR).

This study aimed to determine the effects Unilateral and solidarity to add crushed seeds of black bean and thyme leaves to broiler diets on chemical compassion parameters of main, secondary carcasses and edible parts.

Materials and Methods:

This work done in private farm in kosh Taba closed Erbil city/ kurdistan region/ Iraq with 200 one day old straight run broiler chicks (Ross-308) breeding for 35 days. The chicks were divided randomly into 4 treatments groups (C, T1, T2 and T3). Each treatment was subjected to 5 equal replications of 10 chicks each. The diets were formulated with commonly available feed formula is shown in Table 1 for starter and Table 2 for grower and finisher diet. The dietary treatments were C (control diet) without any additive; T1, T2 and T3 were supplemented with herbs of 0.50% Nigella sativa, 0.50% Thymus vulgaris and 0.25% Nigella sativa, +0.25% Thymus valgaris respectively. A dry mash feed was supplied on *adlibitum* basis. Fresh clean drinking water was given at all the times. Adequate construction breeding (North, 1984) were taken during the experimental period. The birds were housed in cages of 120cm×76cm.

The owner of farm depended on two feeding period, starter from one day till 10 days, grower and finisher from 11 till 35 days the feeding in all treatment is basic on control diet but for each treatment additive as clear in table 1 for T1 0.5 Nigella sativa (NS), T2 0.5 Thymus vulgaris (TV) and for T3 Mixture of (NS) 0.25and (TV) 0.25. For chemical analysis of Nigella sativa and Thymus vulgaris done in Erbil medical university laboratory (Table 3) and compared the results of analysis with analytical of (6).

Table 1: Feed formula and chemical composition of phase starter

control diet Ingredients	Amount in the diet (%)			
	Control	T1	T2	T3
Maize	51.30	51.30	51.30	51.30
Soybean meal	42.00	42.00	42.00	42.00
Soybean oil	4.00	4.00	4.00	4.00
Salt	0.25	0.25	0.25	0.25
Di- Calcium Phosphate	0.50	0.50	0.50	0.50
Calcium premix	1.00	1.00	1.00	1.00
Vitamin-Mineral premix	0.75	0.75	0.75	0.75
DL-Methionine	0.15	0.15	0.15	0.15
Choline Chloride 60%	0.05	0.05	0.05	0.05
Nigella sativa (NS)	0.00	0.5	0.00	0.00
Thymus vulgaris (TV)	0.00	0.00	0.5	0.00
Mixture of (NS)and (TV)	0.00	0.00	0.00	0.25+0.25
Chemical composition	**Amount (%)**			
Dry matter	89.00	89.00	89.00	89.00
Crude protein	23.32	23.21	23.21	23.21
Crude fiber	2.87	2.87	2.87	2.87
Ether extract	2.16	1.76	1.76	1.76
Nitrogen free extract	48.41	48.41	48.41	48.41
Ash	5.75	6.96	6.96	6.96
ME(kcal/kg DM)	2995.33	2995.33	2995.33	2995.33

***Calculated according to (11).**

Table 2: Feed formula and chemical composition of phase finisher

control diet Ingredients	Amount in the diet (%)			
	Control	T1	T2	T3
Maize	52.52	52.52	52.52	52.52
Soybean meal	40.00	40.00	40.00	40.00
Soybean oil	4.70	4.70	4.70	4.70
Salt	0.25	0.25	0.25	0.25
Di- Calcium Phosphate	0.50	0.50	0.50	0.50
Calcium premix	1.00	1.00	1.00	1.00
Vitamin-Mineral premix	0.75	0.75	0.75	0.75
DL-Methionine	0.23	0.23	0.23	0.23
Choline Chloride 60%	0.05	0.05	0.05	0.05
Nigella sativa (NS)	0.00	0.5	0.00	0.00
Thymus vulgaris (TV)	0.00	0.00	0.5	0.00
Mixture of (NS)and (TV)	0.00	0.00	0.00	0.25+0.25
Chemical composition	**Amount (%)**			
Dry matter	89.28	89.28	89.28	89.28
Crude protein	22.68	22.68	22.68	22.68
Crude fiber	2.81	2.81	2.81	2.81
Ether extract	2.16	1.76	1.76	1.76
Nitrogen free extract	48.22	48.22	48.22	48.22
Ash	5.62	5.62	5.62	5.62
ME(kcal.kg^{-1} DM)	3052.5	3052.5	3052.5	3052.5

***Calculated according to (11).**

1 active substances per kilogram of premix: vitamin A 2 500 000 IU; vitamin E 50 000 mg; vitamin D3 800 000 IU; niacin 12 000 mg; d-pantothenic acid 3 000 mg; riboflavin 1 800 mg; pyridoxine 1200 mg; thiamine 600 mg; menadione 800 mg; ascorbic acid 50000 mg; folic acid 400 mg; biotin 40 mg; vitamin B12 10.0 mg; choline 100000 mg; betaine 50000 mg; Mn 20 000 mg; Zn 16 000 mg; Fe 14 000 mg; Cu 2 400 mg; Co 80 mg; I 200 mg; Se 50 mg

Table 3: Chemicals composition of Nigella sativa and Thymus vulgaris

Organic compound %	Nigella sativa	Thymus vulgaris
Moisture	5.58	6.34
Ash	1.88	2.79
Crude protein	21.16	13.86
Ether extract	31.97	4.08
Crude fiber	10.92	25.36
Soluble carbohydrate	22.94	46.55
Voltaic fatty acids	5.28	1.02
Total	100	100

Broiler chickens were kept under the Ross recommendation procedure. Water and rations distributed *ad libitum* and uniform light is repeated 24 hours daily. At the

age of day 4 and 8, birds were vaccinated for protect diseases At the end of experiment; two birds from each treatment were selected randomly and slaughtered for obtain main parts of carcass (breast and thigh) for chemical analysis.

Data of chemical analysis obtained by process analysis of all parts meat in three laboratory, Shaqlawa technical institute, by cooperation of medical university laboratory and external laboratory (al-Ghazaly laboratory) for cholesterol parameters.

The determination of nitrogen in feeds, meat for breast and thigh was performed with the macro-Kjeldahl method according to application of (2).

Total fat content of meat for thigh and breast was determined by application of standard method. Depend on Either Extract (2).

After obtained Either Extract bring by tube to Mizda Private medical Laboratory for Total cholesterol determination by using Gas Liquid Chromatography (GLC) method depend on instruction of (SYRBO Company) for determination cholesterol procedures.

Statistical analysis

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 chemical parameters which $P<0.01$ was considered. Values in percentage were subjected to transformation. All statistical analyses were performed using the software SPSS 17.5 for Windows® (26).

Results and Discussion

Table 4 shows significant differences ($P\leq0.01$) among all treatments for chemical composition expect for Ash was in significant differences ($P\geq0.01$). for moisture, protein ,fat, Ash and cholesterol the best value found in T3 (72.96), T2 (23.95), T3 (2.42),C (1.13) and T3 (40.42) respectively. The results can be explain the reason effect of herbs increase of moisture versus less of percentage fat as we noted in column of % fat because of activate of pepsin enzymatic for digestive feed that make more benefit for analysis peptides and accumulation of protein in muscle (22). These results agree with results of (13). The results also shown in table 4 harmonic effect of powder of Nigella sativa and Thymus vulgaris on protein percentage, It is also known in the equation of the chemical balance for the installation of meat, especially for poultry that the higher proportion of moisture is inversely proportional to the proportion of fat and serially with the other chemical components (18). Results of cholesterol this attribute to synergism and antagonism phenomenon between chemical components as known make less of cholesterol in blood for human and in meat (24). While used as individual viewer less effect than combination with Thymus powder as in T1.

Table 4: Mean ± S.D Effects of adding Nigella sativa and Thymus vulgaris powder on Breast Muscle chemical composition

Attribute / Treatments	Moisture %	Protein %	Fat %	Ash%	Cholesterol Mg.100g^{-1}
C	69.85±0.54a**	20.20± 0.52a	8.77±1.03b	1.13±0.01*	62.40±1.181b
T1	72.65±0.80 b	22.86±0.74 b	3.18±1.51 a	1.26±0.11	41.40±6.98 a
T2	71.73±1.20 b	23.95±1.88 b	3.04±0.76 a	1.27±0.08	51.60±1.05 a
T3	72.96±1.00 b	23.26±1.03 b	2.42±0.53 a	1.30±0.13	40.42±2.30 a

***Insignificant (P≥0.01) **a,b means with different superscript within row are significantly different (P< 0.05) and values will increase from (a)to (b)value. Values mean ±S.D. Standard Deviation of slaughter 10 birds.**

Thigh Muscle

Table 5 shows significant differences (P≤0.01) among all treatments for chemical composition expect for Ash was in significant differences (P≥0.01). For moisture, protein, fat, Ash and cholesterol the best value found in T3 (73.19), T2 (23.43), T1 (3.26), T3 (1.14) and T1 (49.80) respectively. The same effect of decrease of %fat opposite of moisture and protein as we explained in breast muscle. We must stop for cholesterol, ok for control group never adding any type of herbs and normally increase of cholesterol. Because of high value of % fat but for T3 less for C group, so that's mean while mixture may be lead to decrease cholesterol because of activity of synergism and antagonism phenomenon between chemical components but it seem not as adding of (N.S) individual, this may be attribute for natural of muscle in thigh more accumulated of fat versus of breast muscle , this results agree with result of [9]. Because of utilization of Thymus vulgaris whether individually or mixture with Nigella sativa power this back on content of them good percentage of protein as shown in table 5.

Table 5: Mean ± S.D Effects of adding Nigella sativa and Thymus vulgaris powder on Thigh Muscle organic content

Attribute / Treatments	Moisture %	Protein %	Fat %	Ash%	Cholesterol Mg.100g^{-1}
C	68.536± 0.96 a**	20.25±0.93 a	7.02±1.28 b	1.15±0.01*	72.40±3.20 b
T1	71.71± 2.05 b	21.53±1.49 ab	3.26±1.88 a	1.21±0.08	49.80±11.48 a
T2	72.38±1.05 b	23.43±0.51 c	4.30±1.30 a	1.23±0.13	56.00± 12.18 ab
T3	73.19 ±0.77 b	23.17±0.57 bc	4.67±0.57 ab	1.14±0.06	69.50±2.57 b

***Insignificant (P≥0.01) **a,b means with different superscript within row are significantly different (P< 0.05) and values will increase from (a)to (b)value. Values mean ±S.D. Standard Deviation of slaughter 10 birds.**

Conclusion:

Utilization of herbs in general for broiler nutrition improve performance and quality of organic content in meat, but when mixing lead to decrease their effect neither used nor as individual.

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