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EFFECT OF ADDING A DIFFERENT LEVEL OF CRUSHED *THYMUS VULGARIS* LEAVES AND NEOMYCIN ON SOME PRODUCTIVE CHARACTERISTICS OF CHUKAR PARTRIDGE

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ABSTRACT

The study aimed to evaluate the influence of adding antibiotics (NEOMYCIN) and different levels of crushed (*Thymus vulgaris*) leaves on the growth performance of Partridge bird. The study was conducted from 8/11/2018 to 7/2/2019 in the college of Agriculture/ University of Kirkuk, The 100 Birds of partridge were allocated randomly from 28 days old to five treatment groups with four replicates per group, according to these treatments:T1: Basal diet (control group without any additives), T2: Basal diet+(NEOMYCIN) antibiotic at 0.05g/ Kg diet, T3: Basal diet+thyme powder at 1g/Kg diet, T4: Basal diet+thyme powder 3g/Kg diet., T5: Basal diet+thyme powder 5g/Kg diet. The study showed a significant increase in weekly body weight and body weight gain significant decrease in feed intake when compared with the control group, and a significant difference was noted in feed conversion ratio between.

Keywords: Partridge, antibiotic, thyme, productive characteristics

Introduction

The Chukar Partridge is the national bird of Kurdistan region of Iraq, people in the region like to hunt for these birds and rise them which are known for the beauty, wonderful singing ability, and the good tease of meat (Kline, 2002), but they face many problems like predation, diseases, hunting, accidents and habitat degradation especially the wild Chukars which could lead to limiting of the liveliness (Goldová *et al*., 2006). Antibiotic has been used widely to improve feed efficiency and improve growth performance in animals, however, its use has led to development of drug-resistance bacteria and which pose a threat of potential spread of these resistant strain to humans (Maron *et al*., 2013), due to that European Union has banned the use of antibiotics as growth promoters (Markowiak, and Śliżewska, 2018). So plant resources as an alternative for antibiotic are one of the ways for enhancing the growth performance in animals, the plant *Thymus vulgaris* which has many uses in herbal medicine, flavoring agent, and culinary herb, thyme has many properties like anti-fungal, antiseptic, and antibiotics (Stahl-Biskup and Venskutonis, 2012: Ekoh *et al*., 2014) its active ingredient is thymol, phenol, carvacrol, and linalool (Kuete., 2017). There are many studies evaluating the effect of thyme and antibiotic on broiler chicken but less are known about the effect on the chukar partridge, so the present study aims to evaluate the effect of adding a different level of crushed thyme leaf and neomycin antibiotic on the productive characteristics (weekly body weight, feed consumption, and feed conversion ratio (FCR)).

Material and Methods

The study was conducted from 8/11/2018 to 7/2/2019 in the college of Agriculture/ University of Kirkuk, in isolated and sanitized room. 200 chicks of one-day-old partridge birds were received from one of the private hatcheries in Erbil, and they were raised and fed together up to the age of 27 days as a preparatory period were they fed it with a starting diet, The feed and water were provided to the chicks freely throughout the preparatory period, the water was suspended in the water cups, and the feed was provided in special suspended troughs to prevent the scattering of the feed. Then from 28 days to 91 days, they were raised as the trial period were they fed it with starting diet from 28 days, and from day 42 until day 91 growth diet.100 Birds of partridge were allocated randomly in five cages each cage whereof four levels measuring (40*40*80) cm, corresponding to five treatment s with four replicates per treatment as they were submitted to the following dietary treatments; T1: Basal diet (control treatment without any additives), T2: Basal diet + (NEOMYCIN) antibiotic at 0.05g/ Kg diet, T3: Basal diet+thyme powder at 1g/Kg diet, T4: Basal diet+thyme powder 3g/Kg diet, and T5: Basal diet+thyme powder 5g/Kg diet, each cage was equipped with a feeding trough and water cups. The diet is shown in table (1). During the study, the temperature and humidity in the room were kept stable according to the age of the birds.

All the prevalent and approved vaccinations of partridge chicks were conducted against Newcastle disease and according to what is shown in Table (2). Vitamins were given after each vaccination by adding it to drinking water and according to the recommendations of the veterinarian. The flowing traits was evaluated weekly live bodyweight, weekly weight gain, weekly feed consumption, and feed conversion ratio.

The data were analyzed by statistical Analysis System - SAS (2012) to study the effect of different traits studied on the parameters according to a complete random design (CRD) and the significant differences between the averages were compared with the Duncan (1955), polynomial test.

Table 1 : Composition and calculated chemical composition of the starting diet fed (1-41 day) and growth diet (42-91).

Ingredient	Diet (%)	
	Starting Diet (1-41)	Growth diet (42-91)
Crushed wheat	55.75	60.8
Soybean (47%)	34.7	24.6
Wheat bran	-	9.9
Animal protein	5	1
Sunflower oil	2.5	1
Limeston	1.5	1.5
Dicalacium phosphate	-	0.5
salt	0.1	0.1
DL-methionine	0.15	0.3
L-lysine	0.3	0.3
Total	100	100
Calculated chemical composition		
Metabolizable energy, kcal/kg	2844	2701
Crude Protein %	25.06	20.73
Fat %	4.42	2.77
fibre %	4.2	4.66
Methionine %	0.63	0.60
Lysine %	1.593	1.243
Methioine+cysteine %	0.86	-
Calcium %	0.933	0.829
Phosphorus %	0.631	0.505

Table 2 : Health and Vaccination programs for partridges during the study.

Age (days)	Programs
7	First vaccination of Newcastle through direct spray
8-10	Vitamin C given through water
21	Second vaccination of Newcastle through direct spray
22-24	Vitamin C given through water
60	Third vaccination of Newcastle through direct spray
61-63	Vitamin C given through water

Results and Discussion

1. Weekly body weight

One of the performance investigated the weekly body weight which showed significant ($p>0.05$) increase in body weight for T4 over the other treatments in all the weeks, while the addition of neomycin (0.05gm/Kg) in T2 and the addition of thyme at (5gm/Kg) had no significant differences between them in most of the weeks, but there were significant differences with the control treatment T1, as shown in table 3.

In week nine the increase of the body weight was at most when adding thyme (3gm/Kg) in T4 at (442.03 gm) than in T2 when adding (0.05gm/Kg) neomycin at (430.02gm) and T5 adding of (5mg/Kg) thyme at (428.67 gm) while the body weight in T3 when adding thyme at the level of (1gm/Kg) and T1 (control treatment) was (420.04 and 409.53) respectively, as shown in table 3.

These results agree with results of Mothana (2010) and Ragaa *et al.* (2016), where they showed that the addition of thyme to broiler chicken diet significantly increase the bodyweight of the birds, while the result disagreed with that of Ocak *et al* (2008) and Haselmeyer *et al* (2014), showed that the addition of thyme to broiler chicken diet didn't affect the bodyweight of the birds.

When it comes to the addition of antibiotic to the diet of the broiler chicken this study results agreed with that of Abdel-Azeem (2002) and El-Hammady *et al* (2014), where body weight increased significantly with this addition, on the opposite Hassan *et al* (2010) and Mhyson (2017), showed a no-significant increase in body weight with the addition of antibiotic.

Table 3 : The effect of adding Neomycin and different levels of crushed thyme leaf on average weekly live body weight.

Weeks	Treatment (Mean ± standard error)					*P* value
	T1 (control)	**T2** (0.05 gm/Kg) neomycin	**T3** (1gm/kg) thyme	**T4** (3gm/kg) thyme	**T5** (5gm/Kg) thyme	
Week one (29-35)day	148.24±0.85 d	153.73±0.85bc	0.91±152.01 c	161.02±1.47 a	0.85±155.74 B	*
Week two (36-42)day	1.49±191.21 c	0.75±200.23 b	0.75±199.24 b	211.04±0.91 a	1.29±202.03 b	*
Week three (43-49)day	1.03±237.22 d	1.03±244.74 bc	1.19±242.51 c	0.85±262.71 a	0.85±247.22 b	*
Week four (50-56)day	1.47±275.02 d	1.108±288.21 b	1.47±280.03 c	1.29±303.02 a	1.47±286.01 b	*
Week five (57-63)day	e 0.75±300.24	1.58±319.02 c	1.19±308.4 d	1.10±332.73 a	1.65±314.23 b	*
Week six (64-70)day	1.65±331.23 e	1.65±348.21 b	1.35±338.04 d	0.91±362.03 a	1.47±342.05 c	*
Week seven (71-77)day	1.10±362.21 d	1.04±382.51 b	1.08±370.02 c	1.25±391.70 a	1.47±379.02 b	*
Week eight (78-84)day	0.57±386.05 d	0.85±405.23 b	1.47±396.03 c	0.64±419.53 a	1.77±405 b	*
Week nine (85-91)day	1.19±409.53 d	0.70±430.02 b	c0.91±420.04	0.70±442.03 a	1.93±428.67 b	*

* The different letters within the same row indicate the presence of significant differences($p \leq 0.05$)

2. Weekly feed consumed.

The weekly feed consumption showed significant differences between the treatment and there was a decrease in the feed consumption with increase of age in T4 (3 gm/Kg) thyme, there was a significant decrease ($p<0.05$) in cumulative feed consumption rate in (T2,T4,T5) 15566.95 gm, 1576.69 gm, 154.74 gm respectively when compared with the (T1) 1615.16 gm, and (T3) at 1602.03 gm, as shown in table 4.

These results are in agrees with that of Mothana (2010) and Attia *et al.* (2017), where the addition of thyme in broiler chicken diet the feed consumption rate decrease significantly and the same goes with the addition of antibiotic Ahmadi (2010) and Zakeri *et al.* (2011) showed the same result. Ocak *et al.* (2008) and Ragaa *et al.* (2016), results showed a decrease in feed consumption rate but not significantly when adding thyme to the diet, while Abdel-Azeem (2002) and Hassan *et al.* (2010), find no significant differences in feed consumption upon addition of antibiotic to the broiler chicken diet.

3. Weekly weight gain

There were significant differences between the treatments in the weekly weight gain, where, the addition of (3gm/Kg) in T4 showed significant preponderance in weekly weight gain over the other treatments in most of the weeks were the cumulative weight gain was (337.52 gm), then T2 also showed a good increase in cumulative weight gain at (326.72 gm), while in T1, T3, T5 the cumulative gain were (313.01gm, 320.17 gm, and 322.03 gm) respectively, as shown in table 5.

Those results agree with results of Mothana (2010) and Ragaa *et al.* (2016), where the showed significant increase in the birds' weight gain when adding thyme to broiler chicken diet and Abdel-Azeem (2002) and El-Hammady *et al* (2014), showed the same result when adding antibiotic to broiler chicken diet, while it disagreed with results of Ocak *et al* (2008) and Haselmeyer *et al.* (2014), their results showed no significant increase in weight gain upon adding thyme and Hassan *et al.* (2010) and Mhyson (2017) showed the same for adding antibiotic to broiler chicken diet.

4. Feed conversation ratio (FCR)

When it comes to the FCR there were significant differences between the treatment in most of the weeks, in (T2, T4, T5) showed superior significantly ($p<0.05$) over T1 (control treatment), he FCR were 5.42, 5.36, and 5.4 respectively while the T1 was 5.83. T3 also showed superiority over the control treatment were the FCR was at 5.58, as shown in table 6.

Feizi *et al.* (2013) and Wade *et al.* (2018), showed the same results were the addition of thyme to broiler chicken diet improve the FCR, and Hassan *et al.* (2010) and Zakeri *et al* (2011)s studies, showed the same results when it comes to the addition of antibiotic to the diet of broiler chickens. But Ahmadi (2010) results disagreed with this study results in which the addition of antibiotics lead to an increase of FCR.

Table 4 : The effect of adding Neomycin and different levels of crushed Thyme leaf on the average weekly feed consumed (gm/ bird).

Weeks	Treatment (Mean ± standard error)					*P* value
	T1 (control)	**T2** (0.05 gm/Kg) neomycin	**T3** (1gm/kg) thyme	**T4** (3gm/kg) thyme	**T5** (5gm/Kg) thyme	
Week one (29-35)day	1.10±117.73 b	0.91±116.02 b	118.71±1.37 b	124.52±1.75 a	117.23±0.85 b	*
Week two (36-42)day	1.32±133.53 b	0.64±131.51 bc	0.91±134.01 b	0.85±138.22 a	0.91±130.04 c	*
Week three (43-49)day	1.55±156.50 ab	1.75±152.52 bc	0.91±151.03 c	1.32±160.51 a	1.31±149.21 c	*
Week four (50-56)day	1.37±178.22 a	1.37±171.73 b	1.47±173.02 b	1.75±173.5 b	1.37±173.24 b	*
Week five (57-63)day	1.65±201.21 a	1.47±194.03 b	1.75±198.54 ab	1.47±200.03 a	1.37±194.22 b	*
Week six (64-70)day	1.58±191.03 a	1.1±191.22 a	1.47±188.04 a	1.75±190.52 a	1.47±189.01 a	N.S
Week seven (71-77)day	1.65±211.24 ab	1.75±211.22 ab	1.54±214.21 a	1.75±205.53 c	1.75±206.5 bc	*
Week eight (78-84)day	1.37±207.2 b	198.21±1.31 c	1.37±213.23 a	1.37±200.71 c	1.54±213.25 a	*
Week nine (85-91)day	1.32±218.5 a	1.25±210.23 b	1.1±211.24 b	1.39±191.2 c	1.25±194.25 c	*
Cumulative feed consumption	1615.16±13.27 a	1576.69±5.59 bc	1602.03±4.26 ab	1584.74±12.88 bc	1566.95±5.91 c	*

* The different letters within the same row indicate the presence of significant differences($p \leq 0.05$)
-N.S indicates that there are no significant differences.

Table 5 : The effect of adding Neomycin and different levels of crushed thyme leaf on the weekly weight gain (g / bird).

Weeks	Treatment (Mean ± standard error)					*P* value
	T1 (control)	**T2** (0.05 gm/Kg) neomycin	**T3** (1gm/kg) thyme	**T4** (3gm/kg) thyme	**T5** (5gm/Kg) thyme	
Week one (29-35)day	51.74±0.47 b	0.86±50.53 b	1.54±52.72 ab	1.84±56.51 a	1.25±49.24 b	*
Week two (36-42)day	1.63±43.03 b	0.95±46.51 ab	46.25±1.65 ab	0.7±50.04 a	1.37±46.21 ab	*
Week three (43-49)day	1.41±46.02 b	0.28±44.54 b	1.43±43.23 b	1.47±51.71 a	1.79±45.23 b	*
Week four (50-56)day	0.85±37.71 c	0.28±43.51 bc	0.5±37.5 c	0.75±40.54 b	0.75±38.73 a	*
Week five (57-63)day	1.37±25.22 b	0.85±30.73 a	0.5±28.54 a	1.43±29.74 a	0.47±28.23 ab	*
Week six (64-70)day	1.87±31.03 a	0.85±29.21 a	0.95±29.5 a	1.18±29.22 a	0.47±28.71 a	N.S
Week seven (71-77)day	0.7±31.05 bc	1.25±34.23 ab	0.4±32.02 bc	1.03±29.71 c	1.41±36.02 a	*
Week eight (78-84)day	1.43±23.72 b	0.85±22.72 b	0.91±26.04 ab	1.49±27.73 a	1.26±26.53 ab	*
Week nine (85-91)day	0.64±23.54 a	0.75±24.74 a	1.35±24.01 a	0.64±22.52 a	0.44±23.13 a	*
Cumulative weight gain	1.41±313.08 d	0.75±326.72 b	1.25±320.17 c	1.19±337.71 a	1.31±322.03 c	*

* The different letters within the same row indicate the presence of significant differences($p \leq 0.05$)
-N.S indicates that there are no significant differences

Table 6 : The effect of adding the Neomycin and different levels of crushed thyme leaf on the weekly feed conversion ratio (gm feed / g weight gain).

Weeks	Treatment (Mean ± standard error)					*P* value
	T1 (control)	**T2** (0.05 gm/Kg) neomycin	**T3** (1gm/kg) thyme	**T4** (3gm/kg) thyme	**T5** (5gm/Kg) thyme	
Week one (29-35)day	0.03±2.28 a	0.4±2.3 a	0.07±2.25 a	0.06±2.3 a	0.07±2.38 a	N.S
Week two (36-42)day	0.21±3.1 a	0.07±2.83 a	0.09±2.9 a	0.03±2.76 a	0.08±2.81 a	N.S
Week three (43-49)day	0.07±3.4 a	0.01±3.42 a	0.13±3.49 a	0.04±3.1 b	0.11±3.3 ab	*
Week four (50-56)day	0.07±4.73 a	0.04±3.95 d	0.09±4.61 ab	0.06±4.28 c	0.1±4.47 b	*
Week five (57-63)day	0.5±7.98 a	0.13±6.31 b	0.1±6.96 b	0.33±6.73 b	0.15±6.88 b	*
Week six (64-70)day	0.32±6.16 a	0.2±6.55 a	0.19±6.37 a	0.24±6.52 a	0.06±6.58 a	N.S
Week seven (71-77)day	0.17±6.8 ab	0.26±6.17 bc	0.04±6.69 ab	0.25±6.92 a	0.23±5.73 c	*
Week eight (78-84)day	0.59±8.73 a	0.36±8.72 a	0.31±8.19 ab	0.43±7.24 b	0.2±8.04 a	*
Week nine (85-91)day	0.2±9.28 a	0.26±8.5 a	0.42±8.8 a	0.2±8.49 a	0.2±8.4 a	N.S
Total feed conversion ratio	0.1±5.83 a	5.42±0.03 c	0.02±5.58 b	0.03±5.36 c	0.03±5.4 c	*

* The different letters within the same row indicate the presence of significant differences($p \leq 0.05$)
-N.S indicates that there are no significant differences

In the light of these results which is obtained upon adding thyme to the chukar partridge diet which leads to improvement in the productive characteristics of the bird in average body weight, body weight gain, FCR, and decrease in feed consumption, these could bre attributed to many factors one of which that thyme leaf contain lipase, amylase, and proteinase enzymes which they play importuned role in the digestion of lipids, carbohydrate, and protein (Lee *et al*., 2003), beside adding thyme in the broiler chicken diet improve the digestibility of food because it contains substances that are biologically active on metabolism and animal physiology (Hemandez *et al*., 2004). The flavonoids, glycosides, phenols, and saponin presents maybe play important role in the activation of digestive enzyme production (Yamamoto, 2002; Jackie, 2003; Alexander and Romoel, 2008), also thyme powder mean chemical composition is thymol, and carvacrol which has a role as bacteriostatic in the intestines (Deans and Dorman, 2000), which can inhibit bacterial colonization of pathological and normal flora in the intestines (Evans, 2002) which could reflect on the stats of the birds. Thyme has antioxidant efficacy, and this leads to improving the state of the bird through the action of antioxidants in protecting tissues from peroxides and in preventing the catabolism of protein (Stahl-Biskup and Venskutonis, 2002). And these could lead to an increase in the bodyweight of the birds.

Conclusion

So according to the result of this study the addition of thyme and antibiotic (Neomycin) to the diet of chukar partridge has improved the productive characteristics of the bird generally and its especially improve the feed conversion ratio so, it's highly recommended to add thyme to the diet of chukar partridge instead of antibiotic to minims the side effect related with antibiotic and since these birds are highly demanded by the people so further studies are recommended to understand the effect of thymus vulgarise or other medical herbs on the growth performance and other variables on chukar partridge.

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