

Effect of Addition of Alfalfa Meal on the Performance of Black turkey Chickens

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Abstract

The aim of the experiment was to analyse the effect of alfalfa meal addition into fed mixtures on of turkey chickens performance. The feed mixture was prepared with addition of alfalfa meal. Ninety unsexed six week old turkey chicken were used in the experiment. They were randomly allocated to 5 groups of 18 birds each with three replicates each group (6birds/replicate). During the 6 weeks experiment period, the first group (control T1): turkey chickens were fed on a basal diet without any addition alfalfa. The second group (T2) fed on a basal diet with 5 gm alfalfa/Kg diet. The third group (T3) fed on a basal diet with 10 gm alfalfa/Kg diet. The fourth group (T4) fed on a basal diet with 15 gm alfalfa/Kg diet. The fifth group (T5) was fed on a basal diet with 20 gm alfalfa /Kg diet. Feed and water were offered ad-libitum throughout the experiment. The productive parameters including body weight, weight gain, feed intake and feed conversion ratio were measured weekly throughout the experimental period. Growth performance parameter were measured 3 poult per treatment were slaughtered at the end of the experiment to evaluate carcass and muscle characteristics. According to the results, Diet with 20g alfalfa/kg was significantly ($P < 0.05$) increased body weight during at ages 70 and 77 days and body weight improved digitally at 84 days of age as compared to the control group. Also, as diet with 20g alfalfa/kg was significantly ($P < 0.05$) higher body weight gain as compared to control at 70 days of age. While, the different dietary levels of alfalfa meal had no significant effect on body weight at ages 49, 56 and 63 days, weight gain at ages 49, 56, 63, 77 and 84 days, feed intake at all period and feed conversion ratio at ages 49, 56, 63, 77 and 84 days. On the other hand, carcass weight, breast weight, thigh weight and wing weight were improved digitally as compared to the control group in diet 20g alfalfa/kg. But, the different dietary levels of alfalfa meal had no significant effect on dressing percentage, liver, gizzard and heart weight.

Keywords: turkey, performance, alfalfa, feed, growth, poult, carcass .

Introduction

Medicago sativa L. is one of the cheapest sources of protein from the aspect of high yields and low production costs [1]. Alfalfa is a commercially available feedstuff that is high in protein (17.5%) and crude fiber (24.1%) while exhibiting a relatively low

metabolizable energy (1,200 kcal/kg) [2]. It has a high crude protein content [3], with well-balanced contents in amino acids [4, 5, 6, 7, 8]. *Medicago sativa* L. is a readily available, high protein, high fiber feedstuff with one of the slowest rates of passage through the avian system [9]. It contains many active

components such as flavonoids, β -carotene, tocopherol [10]. Due to the high content of saponins (2– 3% of dry matter), alfalfa meal has hypocholesterolaemic, anticarcinogenic, anti-inflammatory, and antioxidant activities [11]. In a recent study by [12] it was revealed that the different levels of alfalfa inclusion in broiler diet effects on feed intake to consume more feed which led to significant higher body weight. Also, *Medicago sativa* L. is an important source of vitamins [8], such as β -carotene and another 10 vitamins [3, 13, 4], various microelements too. The animals need these nutrients for normal growth and development [14]. [15] suggested that due to the higher content of fibre in alfalfa, its use in monogastric animals should be restricted. Dehydrated alfalfa is usually used at very low

levels in poultry diets, due to its high crude fiber and low metabolic energy contents [16]; however, it is a rich source of vitamins, carotenoids [4]. [17] Indicated that addition of 90 g/kg alfalfa meal into the laying quail diets had no adverse effect on performance. Additionally, [15] reported that inclusion of alfalfa in diets of laying hens reduced performance expressed in term of body weight. Also, Diets containing 10% or more alfalfa meal affected feed consumption in geese, turkeys, quails and broilers [18] and daily weight gain and feed efficiency in geese [19]. Therefore, the purpose of this study was to evaluate the effect of alfalfa meal on the productive performance of turkey chicken.

Material and Methods

This study was conducted at the Poultry Research Farm College of Agricultural Engineering Sciences, Sulaimani University during the period from August, 6st 2018 to September, 17th, 2019. A total of (90) turkey chickens in forty two days of age achieved from Haler (Qushtapa) and that were used in this experiment. The poults were distributed to five experimental groups randomly. There were 3 replicates in each experiment group and in each replicates there were 6 poults. During the 6 weeks experiment period, the first group (control T1): chicks were fed on a basal diet without any addition alfalfa. The second group (T2) fed on a basal diet with 5 gm alfalfa/Kg diet. The third group (T3) fed on a basal diet with 10 gm alfalfa/Kg diet. The fourth group (T4) fed on a basal diet with 15 gm alfalfa/Kg diet. The fifth group (T5) was

fed on a basal diet with 20 gm alfalfa /Kg diet. Experimental diets were balanced to meet or exceed the nutrient requirements for poults [2] and formulated to be isocaloric and isonitrogenous with only the alfalfa meal levels in the diets differing (Table 1). Birds were housed in an animal house equipped with 15 Wire mesh cages (140 x 120 x 90 cm). Feed and water were offered ad-libitum throughout the experiment (6-12 weeks). Light was provided for 24 h/day throughout the experimental period. poults were placed environmentally controlled room (23-27°C). At the beginning of this experiment all turkey chickens were weighted and divided into experimental groups so that the average weight was the same in all groups without any significant differences. Also, body weight (BW) and Feed intake were recorded biweekly. Two phases of feeding program

were involved in supplying: grower diets (22% CP) were formulated From period 42 to 63 days of age in (Table 1). Then, they were switched to finisher diets (19% CP) from 64 to 84 days of age (Table 1.)

In the end of this experiment all data were analyzed using XL Stat [20]. The significant differences between the means of traits were determined using Duncan's multiple range tests [21]. Under the probability $P < 0.05$.

Table 1. Compositions of diets for poult at ages of 42-84 days

Feed Ingredients	Compositions of diets in (42-63 days of age).					Compositions of diet in (64-84 days of age).				
	T1 (control)	T2	T3	T4	T5	T1 (control)	T2	T3	T4	T5
Yellow corn	53.1	52.8	52.3	52	51.5	58.7	58.2	57.9	57.4	57
Soybean meal	27.4	27.2	27.2	27	27	21.8	21.8	21.6	21.6	21.5
Protein concentrate	8	8	8	8	8	5	5	5	5	5
Wheat	9	9	9	9	9	12	12	12	12	12
Sun flower seed oil	2	2	2	2	2	2	2	2	2	2
Salt	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Alfalfa	0	0.5	1	1.5	2	0	0.5	1	1.5	2
Premix	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total	100	100	100	100	100	100	100	100	100	100
% Crude Protein (cp)	22	22	22	22	22	19	19	19	19	19
Energy Kcal(kg)	3086	3071	3054	3040	3022	3186	3169	3154	3137	3121

Table 2. Composition of protein concentrate.

Nutrients	Inclusion %	Added Vitamins, minerals, trace elements and additives per kg:		
Crude protein	40.00	Vitamin A	220.00	I.U.
Crude fat	5.00	Vitamin D ₃	60.00	I.U.
Crude fiber	2.00	Vitamin E	600	mg
Moisture	7.60	Vitamin B1	60	mg
Crude ash	28.30	Vitamin B2	140	mg
Calcium	5.60	Vitamin B6	80	mg
Phosphorus	2.60	Vitamin B12	700	mg
Phosphorus (avail.)	4.65	Vitamin H(Biotin)	2.00	mg

Nutrients	Inclusion rate:	Added Vitamins, Minerals, trace elements and additives per kg:		
Lysine	3.85	Niacin	800	mg
Methionine	3.70	Vitamin BC (folic acid)	20	mg
Meth+cyst	4.10	Vitamin K ₃	50	mg
Tryptophane	0.40	d-pantothenic acid	320	mg
Threonine	1.29	Choline chloride	5.00	mg
Metabolizable Energy	2150.00	Cu (from Copper Sulphate)	200	mg
Sodium	2.30	Mn(from Manganese oxide)	1.60	mg
CL	4.00	Zn (from zinc oxide)	1.20	mg
		Fe (from Iron Sulphate)	1.00	mg
		I (from calcium iodate)	20	mg
		Se (from sodium selenite)	5	mg
		Antioxidant	100	mg
		6-phytaseEC3.1.3.26 (46)	30.00	Fyt
		Salinomycine -Sodium	1.00	Mg

Brocon-5 Special W (WAFI- HOLLAND.)

Table 3. Chemical composition of alfalfa hay cubes.

Item	Alfalfa hay cubes
Dry matter (%)	86.3
Chemical composition (%DM)	
OM	8.4
CP	15.4
EE	2.4
CF	26.5
NDF	38.9
ADF	30.4
NFE	42.1
TDN	50.7
DCP	10.9

Body weight:

DM, dry matter; OM, organic matter; CP, crude protein; EE, ether extract; CF, crude fiber; NDF, neutral detergent fiber; ADF, acid detergent fiber; NFE, nitrogen free extracts; TDN, total digestible nutrients; DCP, digestible crude protein. [22] Asian Australas. J. Anim. Sci. 28:966-975.

Results and Discussion

Means of live body weight of turkey chickens were stated in (Table 4).The results showed that there were not any significant differences between experimental treatments during at 49, 56 and 63 days of ages. These results are agree with [23] they concluded that use dietary alfalfa meal had no significant

effect on body weight change (BWC) ($P>0.05$) in quail breeder. In addition to a similar result was observed by [8] in a study they found that all ducks fed alfalfa meal diet were not significantly different in body weight from those on the control ($p>0.05$). Similarly, [17] demonstrated that adding 3, 6 and 9% alfalfa meal to diets of laying quails had no significant effect on live weight. While, at ages 70 and 77 days all turkey chickens fed diets supplemented with 20 g alfalfa /Kg of diet (T5) had the highest values ($p<0.05$) of live body weight as compared with control group (T1). May be due to, It has high protein content in the leaves, thus it comes in the second rank after soybeans as a source of protein [24]. Similar results have also been reported by [25] showed that alfalfa flavonoids AAF adding in the diet with 300 mg/kg significantly increased final weight of Yangzhou geese aged from 28 to 70 days. Also [10] reported that inclusion of AAF in broiler chickens could improve the growth performance when compared with the control group, especially when the inclusion level was 15 mg/kg diet. Meanwhile, these results disagree with [15] showed that inclusion of alfalfa (151 g/kg) in diets of laying hens decreased body weight at week 44, 48, and 52 of the experiment. In this experiment, at 70

days of age, there were not significant differences between T1, T3 and T4. Also, T2 and T5 were not difference. And also T2 and T3 were not differences in body weight. Also in this experiment at 77 days of age there were not significant differences between T1, T3 and T4. In the same time, there were not significant differences between T2, T3 and T5 in body weight. These findings are in agreement with those of [26], which showed that an aqueous alfalfa extract did not exert any significant effect on the performance of broiler chickens. On the other hand there were not significant differences between treatments at 84 days of age. But, live body weight was digitally improved in T5 as compared to control T1. In earlier studies had shown that effects of alfalfa meal on performance could be different. Also, [27].reported that turkeys can use crude fiber slightly and concentrations of 60 g fiber/kg in the diet did not cause reduced performance after the age of 6 weeks. Also, [28] showed that variety of biologically active compounds of alfalfa could improve digestion and utilization of feed nutrients. In a recent study by [12] revealed that the final body weight was significantly higher ($P < 0.05$) in the different levels of alfalfa inclusion in broiler diet group than in the control group .

Table 4. Effect of different levels of Alfalfa on body weight (g) (Means \pm SE) of turkey chickens.

Treatments *	Body weight (gm.)						
	Age (day)						
	42	49	56	63	70	77	84
T1(control)	324.167 \pm 0.833 ^a	332.637 \pm 13.487 ^a	424.722 \pm 6.567 ^a	500.666 \pm 73.467 ^a	454.722 \pm 25.578 ^c	495.833 \pm 44.261 ^b	604.167 \pm 59.202 ^a
T2	324.999 \pm 0.833 ^a	333.250 \pm 6.933 ^a	403.944 \pm 6.324 ^a	466.250 \pm 34.027 ^a	615.833 \pm 37.335 ^{ab}	752.917 \pm 24.647 ^a	806.944 \pm 24.487 ^a

T3	315.833±9. 216 ^a	338.889±1 5.652 ^a	407.222±26 .428 ^a	455.555±4 1.862 ^a	483.611±32 .283 ^{bc}	599.722±4 6.920 ^{ab}	767.778±1 71.187 ^a
T4	316.944±5. 189 ^a	343.055±9 .911 ^a	380.000±20 .816 ^a	420.000±5 4.083 ^a	396.667±64 .957 ^c	482.222±1 01.568 ^b	689.167±4 0.834 ^a
T5	318.611±4. 819 ^a	346.500±3 4.250 ^a	434.333±77 .171 ^a	492.083±7 8.509 ^a	674.167±63 .053 ^a	729.444±1 00.057 ^a	771.667±5 8.333 ^a

:*Means with different superscript within factor differ significantly ($p < 0.05$).

*T1=control, T2, T3, T4 and T5 Adding 0, 5, 10, 15 and 20gm Alfalfa/kg feed respectively.

Weight gain

The effect of different levels of alfalfa on weight gain of poult is presented in (Table 5). Results showed that birds fed of (20gm alfalfa/kg diet) had significantly higher values ($P < 0.05$) in weight gain compared with birds when fed on (0 gm. alfalfa/kg diet) at 70 days of age. This result is in agreement with these reported by [25] who showed that AAF adding in the diet with 300 mg/kg significantly increased average daily gain of Yangzhou geese aged from 28 to 70 days. Also in this experiment, at ages 49, 56, 63, 77 and 84 days, the differences of weight gain between poult groups was non-significant. These results agree with [8] in a study they found that all ducks fed alfalfa meal diet were not significantly different in average daily gain from those on the control ($p > 0.05$). Also, poult fed of (10gm alfalfa/kg diet) had

numerically higher values ($P < 0.05$) in weight gain compared with poult when fed on (0 gm. alfalfa/kg diet) at 70, 77 and 84 days of age. Therefore, the enzymatic content of the alfalfa leaves including phytase is a great important in digestion, which might be an additional reason in the results of this treatment T3 which outperformed the control group in terms of weight gain [24]. The result of the present study was agreed with the results of [29], who revealed that the addition of 2% alfalfa increased body weight gain of broilers as compared with control birds, which may be due to inclusion of fibres within alfalfa that improved the BWG and FCR of broilers [30]. And [31] also showed that broilers can maintain an adequate BWG when fed diets supplemented with high levels of insoluble fiber.

Table 5. Effect of different levels of Alfalfa on weight gain (g) (Means \pm SE) of turkey chickens.

Treatments *	Weight gain (g)					
	Age (day)					
	49	56	63	70	77	84
T1(control)	8.470 \pm 14.2 35 ^a	92.085 \pm 14.0 20 ^a	75.944 \pm 80.0 35 ^a	- 45.944 \pm 52.1 08 ^c	41.111 \pm 37.09 7 ^a	108.333 \pm 15. 434 ^a
T2	8.251 \pm 6.95 3 ^a	70.694 \pm 11.3 25 ^a	62.306 \pm 40.0 92 ^a	149.583 \pm 38. 204 ^{ab}	137.083 \pm 58.6 76 ^a	54.028 \pm 43.0 23 ^a
T3	23.056 \pm 8.4 76 ^a	68.333 \pm 11.6 77 ^a	48.333 \pm 43.1 11 ^a	28.056 \pm 41.6 45 ^{bc}	116.111 \pm 45.1 06 ^a	168.056 \pm 127 .125 ^a
T4	26.111 \pm 8.8 76 ^a	36.945 \pm 17.1 88 ^a	40.000 \pm 37.5 28 ^a	- 23.333 \pm 10.9 29 ^c	85.555 \pm 44.78 7 ^a	105.834 \pm 24. 167 ^a
T5	27.889 \pm 30. 012 ^a	87.833 \pm 43.7 57 ^a	57.750 \pm 9.69 6 ^a	182.083 \pm 46. 404 ^a	55.278 \pm 85.26 1 ^a	42.222 \pm 84.0 10 ^a

:*Means with different superscript within factor differ significantly ($p < 0.05$.)

*T1=control, T2, T3,T4 and T5 Adding 0, 5, 10, 15 and 20gm Alfalfa/kg feed respectively.

Feed

Results in table (6) showed that the statistical analysis of the effect of adding four ratios of alfalfa to turkey chickens diet in feed intake between experimental treatments. There were no significant effects ($P < 0.05$) in feed intake between T1, T2, T3, T4 and T5 throughout rearing total periods. These results are agree with [32] who showed that no significant difference was found for feed intake among the control and treated birds during the entire experimental period. Also similarly, Adding 3, 6 and 9% alfalfa meal to diets of laying quails had no significant effect on feed consumption [17]. On the other hand, these findings agreed with those of [8] who found that all ducks fed alfalfa meal diet were not significantly different in feed intake from

intake

those on the control ($p > 0.05$). Also, the poult fed the (20g alfalfa/kg diet) had numerically the highest feed intake than control group (0g alfalfa/kg diet) at the ages 56, 70, 77 and 84 days. Which may be attributed to the role of the alfalfa phytase enzyme content which led to an increase in the utilization of food in general, and thus obtaining a good amount of protein, minerals and vitamins that have an appetite-stimulating effect [33]. The current results are consistent with the findings of [25] showed that AAF adding in the diet with 300 mg/kg significantly increased feed intake of Yangzhou geese aged from 28 to 70 days. Also, these results are agreed with [23] they concluded that use dietary alfalfa meal had a significant effect on feed intake (FI) ($P < 0.05$) in quail breeder. In spite of, these results disagree with. [15] showed that inclusion of

alfalfa (151 g/kg) in diets of laying hens the experiment decreased feed intake FI in the first 4 weeks of

Table 6. Effect of different levels of Alfalfa on feed intake (g) (Means \pm SE) of turkey chickens.

Treatments *	feed intake (g)					
	Age (day)					
	49	56	63	70	77	84
T1(control)	124.165 \pm 15.814 ^a	166.775 \pm 11.942 ^a	209.027 \pm 17.782 ^a	237.500 \pm 25.743 ^a	229.720 \pm 45.049 ^a	259.167 \pm 46.196 ^a
T2	140.555 \pm 2.058 ^a	166.611 \pm 4.157 ^a	214.305 \pm 23.500 ^a	262.917 \pm 38.893 ^a	302.083 \pm 13.813 ^a	288.889 \pm 1.822 ^a
T3	128.166 \pm 14.632 ^a	176.805 \pm 24.597 ^a	205.833 \pm 25.672 ^a	267.500 \pm 33.942 ^a	250.833 \pm 13.097 ^a	212.778 \pm 36.392 ^a
T4	134.666 \pm 14.746 ^a	165.278 \pm 22.222 ^a	179.233 \pm 29.438 ^a	207.917 \pm 13.431 ^a	245.000 \pm 59.231 ^a	351.667 \pm 63.334 ^a
T5	115.694 \pm 3.448 ^a	181.333 \pm 37.773 ^a	205.750 \pm 14.647 ^a	257.500 \pm 38.757 ^a	295.000 \pm 21.794 ^a	264.444 \pm 32.236 ^a

:*Means with different superscript within factor differ significantly ($p < 0.05$).

*T1=control, T2, T3,T4 and T5 Adding 0, 5, 10, 15 and 20gm Alfalfa/kg feed respectively.

Feed conversion ratio (FCR)

Results in table (7) showed that the average weekly feed conversion ratio of poults fed with different levels of alfalfa from 6 – 12th week. There were no significant effects alfalfa ($P < 0.05$) in feed conversion ratio between treatments throughout rearing period even mean of total periods except (t4) at the age70 day. In addition to there were not significant differences between T1, T2, T3 and T5 at the age70 day. These results are agree with [23]

they concluded that use dietary alfalfa meal had no significant effect on feed conversion ratio (FCR) ($P > 0.05$) in quail breeder. In addition to [8] in a study they found that All ducks fed alfalfa meal diet were not significantly different in gain-to-feed ratio from those on the control ($p > 0.05$). Also, [34] noted dietary inclusion of alfalfa meal (5 % and 10 %) in broiler diets showed no significant effect in feed consumption, feed conversion and carcass yield.

Table 7. Effect of different levels of Alfalfa on feed conversion ratio (FCR) (Means \pm SE) of turkey chickens.

Treatments *	Feed conversion ratio (FCR)					
	Age (day)					
	49	56	63	70	77	84
T1(control)	6.068 \pm 7.716 ^a	1.922 \pm 0.371 ^a	3.847 \pm 8.750 ^a	- 0.111 \pm 4.563 ^a	0.679 \pm 2.774 ^a	2.436 \pm 0.446 ^a
T2	- 6.434 \pm 19.804 ^a	2.482 \pm 0.392 ^a	8.116 \pm 4.389 ^a	1.969 \pm 0.493 ^a	3.337 \pm 1.416 ^a	- 1.111 \pm 4.234 ^a
T3	6.587 \pm 1.529 ^a	2.617 \pm 0.137 ^a	- 34.249 \pm 41.993 ^a	0.358 \pm 3.288 ^a	2.732 \pm 0.756 ^a	5.087 \pm 3.167 ^a
T4	8.316 \pm 4.765 ^a	14.438 \pm 10.905 ^a	0.691 \pm 3.286 ^a	- 12.894 \pm 4.265 ^b	6.520 \pm 3.997 ^a	3.361 \pm 0.169 ^a
T5	0.834 \pm 4.274 ^a	2.680 \pm 0.620 ^a	3.769 \pm 0.636 ^a	1.493 \pm 0.178 ^a	0.679 \pm 2.774 ^a	0.952 \pm 1.421 ^a

:*Means with different superscript within factor differ significantly ($p < 0.05$).

*T1=control, T2, T3, T4 and T5 Adding 0, 5, 10, 15 and 20gm Alfalfa/kg feed respectively.

Carcass weight and Carcass cuts:

Data of carcass weights and carcass cuts are summarized in (Table 8). There were not significant differences between treatments in carcass weight, dressing percentage, breast weight, thigh weight and wing weights as compared with control group. A similar result was observed by [34] noted dietary inclusion of alfalfa meal (5 % and 10 %) in broiler diets showed no significant effect in feed consumption, feed conversion and carcass yield. However, T2, T3 and T5 were literally higher in carcass, breast, thigh and wing weights as compared with control group. These results are in agreement with those

reported for Yang zhou geese by [25] who did not find any significant difference for slaughter performance except for the breast muscle weight and ratio which were significantly higher than those in the control group. In addition to [8] in a study they found that the Ducks given 9% alfalfa meal had higher breast meat percentage compared with those given no alfalfa meal. Also, these results were not agreed with [8] in study they found that the Ducks given 3, 6, and 9% alfalfa meal had significantly higher dressing percentage and lower abdominal fat percentage compared with those given no alfalfa meal.

Table 8. Effect of different levels of Alfalfa on carcass weight, dressing percentage, Breast, Thigh and Wing weights (g) (Means \pm SE) of turkey chickens at 84 days of age.

Treatments *	Carcass weight and Carcass cuts weights (gm.) at 84 days of age				
	Carcass weight	Dressing percentage	Breast weight	Thigh weight	Wing weight
T1(control)	480.000 \pm 89.489 ^a	86.408 \pm 13.194 ^a	121.667 \pm 22.048 ^a	133.333 \pm 28.916 ^a	85.000 \pm 18.930 ^a
T2	595.000 \pm 25.658 ^a	79.038 \pm 3.990 ^a	170.000 \pm 12.583 ^a	165.000 \pm 10.408 ^a	110.000 \pm 7.638 ^a
T3	541.667 \pm 116.988 ^a	90.668 \pm 33.611 ^a	141.667 \pm 28.480 ^a	153.333 \pm 40.961 ^a	96.667 \pm 23.333 ^a
T4	476.667 \pm 15.899 ^a	74.732 \pm 0.075 ^a	115.000 \pm 8.660 ^a	131.667 \pm 4.410 ^a	81.667 \pm 4.410 ^a
T5	582.500 \pm 152.500 ^a	78.360 \pm 24.951 ^a	160.000 \pm 55.000 ^a	162.500 \pm 37.500 ^a	100.000 \pm 20.000 ^a

:*Means with different superscript within factor differ significantly ($p < 0.05$).

*T1=control, T2, T3, T4 and T5 Adding 0, 5, 10, 15 and 20gm Alfalfa/kg feed respectively.

Liver, Heart and Gizzard weights at 84 days of age. There were no significant differences between treatments as compared with control group in liver, gizzard and heart weight.

Results in table (1) showed that Table 9 presents the means \pm SE of liver weight, gizzard weight and heart weight of turkey chickens fed different levels of alfalfa rations

Table 9. Effect of different levels of Alfalfa on liver, gizzard and heart weights (g) (Means \pm SE) of turkey chickens at 84 days of age.

Treatments *	Organ weights (gm.) at 84 days of age		
	Liver weight	Gizzard weight	Heart weight
T1(control)	20.000 \pm 2.887 ^a	18.333 \pm 1.667 ^a	5.000 \pm 0.000 ^a
T2	16.667 \pm 1.667 ^a	20.000 \pm 0.000 ^a	5.000 \pm 0.000 ^a
T3	20.000 \pm 2.887 ^a	20.000 \pm 2.887 ^a	5.000 \pm 0.000 ^a
T4	18.333 \pm 1.667 ^a	16.667 \pm 1.667 ^a	5.000 \pm 0.000 ^a
T5	20.000 \pm 0.000 ^a	17.500 \pm 2.500 ^a	5.000 \pm 0.000 ^a

:*Means with different superscript within factor differ significantly ($p < 0.05$).

*T1=control, T2, T3, T4 and T5 Adding 0, 5, 10, 15 and 20gm Alfalfa/kg feed respectively.

Conclusion

The results obviously indicated that the best production performance parameters were achieved by the birds fed the diet supplemented with (20gm alfalfa/Kg diet) the lower performance were attained by the birds. Acknowledgment: We are grateful to University of Sulaimani, College of

fed 0% level. It can be recommended that alfalfa can be used as feed additives at level of (20gm alfalfa /Kg diet) to improve the overall performance of turkey chickens.

Agricultural Engineering Science, department animal science .

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