

The Effect of Replacement the Synthetic Methionine and Lysine with Indian Herbal in Improvement the Nutritive Value of Turkish White Sorghum in the Diet of Local Females Quail on Productive Performance

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ABSTRACT

This experiment was Carried out in the poultry farm of animal production department-agriculture college - Kirkuk university for the period 31/1/2020 until 29/12/2020 , the period of this experiment was 60 days and the aim of this study was to determine the effect of using herbal methionine (H.M) and herbal lysine (H.L) instead of synthetic methionine (S.M) and synthetic lysine (S.L) for improvement the nutritive value of the White Turkish Sorghum (W.T.S) in the female quail diet upon the performance . A total 288 females quail at 50 days old distributed randomly on 12 experimental treatments with 6 replicates (6cages) for each treatments and the number of birds in each cage (replicate) were 4 birds .The feed was ad libitum and water was available for the birds and the treatments were , T1 : (control) based diet (57%corn and the S.M + S.L were added for complete the nutritional requirements , T2: basal diet (28.5% corn + 28.5% W.T.S and the S.M + the S.L were added to complete the nutritional requirements), T3: basal diet (57% W.T.S and the S.M + S.L were added to complete the nutritional requirements) , T4: basal diet (28.5% corn + 28.5% W.T.S and the S.M + H.L were added to complete the nutritional requirements) , T5: basal diet (28.5% corn + 28.5% W.T.S and S.M + H.L were added to complete the nutritional requirements) ,T6: basal diet (28.5% corn + 28.5% W.T.S and H.M + H.L were added to complete the nutritional requirements) , T7 : basal diet (57% W.T.S and the H.M +H.L were added to complete nutritional requirements), T8: basal diet (57% W.T.S and S.M + H.L were added to complete nutritional requirements) ,T9: basal diet (57% W.T.S and S.M + H.L were added to complete nutritional requirements) , T10: basal diet (57% W.T.S and added 20% above of nutritional requirements from H.M + H.L) ,T11: basal diet (57% W.T.S and added 20% above of nutritional requirements from S.M + H.L) ,T12: basal diet (57%% W.T.S

and added above 20% above of nutritional requirements from H.M + H.L). The results of the statistical analysis showed improvement the egg production (%H.D) for T5 birds (86.63%) by comparing that with T1 birds (82.19%) and the difference among the treatments were no significant . The Weight and mass of egg for the birds of the treatments (5,8) were best than the T1 birds and the weight and mass of egg for the T5 was 11.81gm and 11.24 gm respectively while was 11.53 gm and 9.75gm for T8 respectively . Non Significant founded among treatments for feed intake and feed conversion ratio , on other hand the average of feed and protein conversion ratio for the T5 and T1 were (5.20, 0.492) and (5.00 , 0.535) respectively , while the conversion ratio of methionine were (1.102 and 1.200) for the T5 and the T1 respectively . The best lysine conversion ratio was for the T5 (2.455 mg lysine/gm of egg) . The were no significant difference among treatments for the external and internal quality traits of the eggs among the treatments except the difference for the yolk color score were significantly ($p < 0.05$) lower value for the treatments (3 ,7 ,8 ,9 ,10 ,11 and 12) than treatments (1 ,2 ,4 ,5 and 6) . the difference were no significant among treatments for the sensory traits. Founded lowest feed cost per one kilo-gram of egg production were for the birds of treatments and the averages of the treatments were (1.144 , 1.145 , 1.229 ,1.209 ,1.122 , 1.235 , 1.328 ,1.202 ,1.213 , 1.301 ,1.276 and 1.279 dollars)respectively .

Key Words : Corn ,White Turkish Sorghum ,Herbal Methionine , Herbal Lysine and Quail.

Introduction

Methionine is an indispensable amino acid and is important for energy production , protein synthesis , enhancing egg production , improve egg size , growth performance , feed efficiency utilization and livability for birds[Binder. (2003) ; Aerni et al . (2005) ; Ibrahim .(2014); Faris & AL-naami. (2018) ; Saed & AL-naami , 2020]. The second limiting amino acid is lysine [Ribeiro et al .(2013) and Fouad et al .(2018)]. Lysine is necessary for physiological function of immune system kidd . (2004) . Lysine improve intestinal functions Vaezi et al .(2011) and regulate protein and lipid metabolism[Tesserand et al.(1996) and Fouad & El-senousey . (2014)] . Maximize the performance [Tesseraud et al . (1999) ; Lemme et al .(2002) and mehri et al .(2013)] . Increase product quality as meat for the broiler and as egg quality for the layer fouad et al .(2018) . The problem of using synthetic methionine are the high cost synthetic

methionine , which produce chemically from acrolein , methyl mercaptan and hydrogen cyanide figge et al .(2010)and the risk of chemical residues for human health [Ahmed and Abbas .(2015) ; AL-hashimi & AL-hussani . (2020)] .N-Lysine is photo additive Containing herbal ingredient extracts and herbal lysine has been found to replace synthetic lysine Sharma & Ranjan.(2016) . The aim of this study was to investigation the effect of using herbal source (phyto substance) of Methionine and Lysine for improving the nutritive value of W.T.S in the females quail upon the performance.

Material and methods

Birds , diets and management: in this study 288 females of local quails at 50 days of age were allocated randomly to 12 dietary treatments(Table 1) , where each comprised 6 replicates (cages) at battery system with 6 birds . The nutritional treatments formulated according to the nutritional requirements of NRC(1994). The period of this experiments (Recording Data) was 60 days. The source of the synthetic methionine as DL-methionine was (Met AMINO) and for lysine was (Lys AMINO) from the Evenik Degussa Antwerp company-Germany while the herbal source of the methionine and lysine was Indian Argauo organic (LTI) . the performance traits were recorded daily (egg production as %H.D ; weight and mass of the egg ; intake and conversion ratio of feed , protein , methionine and lysine) The lighting system was 17h light 7h dark daily .

Statistical analysis

Data were subjected to one-way analysis of variance (ANOVA) in a completely randomized design and treatments were tested for statistical significance by Duncan's multiple rang tests (1955)using software of SAS (2000).

Table (1)Percentages of the feedstuffs of the dietary treatments

Feed Ingredient's	Dietary Treatments											
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
Wheat	0.30	0.81	1.14	0.81	0.81	0.81	0.29	0.29	1.08	0.87	0.87	0.87
Corn	57	28.5	–	28.5	28.5	28.5	–	–	–	–	–	–
WTS *	–	28.5	57	28.5	28.5	28.5	57	57	57	57	57	57

Soybean meal	31.93	30.50	30.21	30.50	30.50	30.50	31.93	31.93	30.21	30.21	30.21	30.21
Sunflower oil	2.57	3.50	3.50	3.50	3.50	3.50	2.57	2.57	3.50	3.50	3.50	3.50
Limestone	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35
Di-calcium Phosphate	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94
Choline chloride (60%)	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Salt	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Vitamins and Minerals	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
L-Lysine	0.10	0.10	0.10	0.10	–	–	0.10	–	–	0.22	–	–
H-Lysine	–	–	–	–	0.10	0.10	–	0.10	0.10	–	0.22	0.22
DL-Methionine	0.27	0.25	0.21	–	0.25	–	–	0.27	–	–	0.36	–
H-Methionine	–	–	–	0.25	–	0.25	0.27	–	0.27	0.36	–	0.36
Total	100	100	100	100	100	100	100	100	100	100	100	100
Calculated chemical composition												
ME(Kcal/Kg)	2965	2900	2850	2900	3000	3000	2900	2980	2850	2850	2850	2850
CP(%)	20.17	20.15	20.62	20.10	20.18	20.18	21.3	21.3	20.58	20.58	20.59	20.59
Lysine (%)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.20	1.20	1.20
Methionine(%)	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.54	0.54	0.54
Calcium(%)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Available phosphorus(%)	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35

*STW: white Turkish Sorghum .

Results and discussion

Egg production as %H.D was not significantly affected by the percentage of replacing (W.T.S) with corn and adding herbal source instead of synthetic source (Table 2) , the best average for egg production were 86.83 % and 84.3% for T5 and T8 respectively while the rate of this trait for the T1 (controls treatments) was 82.19% H.D On other hand there were weight and T8 significant variation ($p \leq 0.05$) founded among treatments for the Weight

and mass of the egg (Table 2) by recording (11.81gm , 11.53gm , 10.24gm and 9.75gm) and (11.53 ,9.75 gm) for the birds of T5 and T8 while the same two twits for T1 (control group) were 11.42gm and 9.40gm respectively and differences were no significant among the birds of the T1 , T5 and T8 The results shown in the Table 2. obtain no significant variation among the treatments for the intake and conversion ratio of the feed the another results of this study were presented in Table 3. The level of replacing percentage of corn by (W.T.S) or replacing source for methionine and lysine had no significant effect on intake and conversation ratio of protein , while the differences were significant ($p \leq 0.05$) among the birds of the treatments for the methionine and lysine intake or conversion ratio (Table 3) . the ability of methionine and lysine conversion ratio were significantly($p \leq 0.05$) better for treatments (1,2,3,4,5,6 and 9) by comparing with the treatments (10 , 11 and 12) The birds of the fifth treatments were the best ability for conversion ratio of methionine and lysine to egg (1.102 and 2.455) respectively while for the birds of control group (T1) were (1.200 and 2.675) respectively.

The results of this study cleared the using 28.5% of (W.T.S) instead of corn which supplemented with S.M + S.L or the using 57% of (W.T.S) instead of corn and supplementation of the diet with H.M + H.L led to best performance traits by comparing with T1. The cause of that was the efficiency of H.M and H.L to depression the activity of tannins and increased the processing of digestion absorption and metabolism of the nutrients and our results agreement in most Scientific facts with other workers about the activity of herbal methionine and lysine for production traits [Latshaw . (1976) ; ChattoPadhyay & Roy. (2006) ; Kalbande et al. (2009) ; Igbasam et al.(2012) ; Emami et al .(2012); Ahmed &Abbas . (2015) ; Sharma & Ranjan .(2016) ; Kathirvelan et al . (2016) ; Xiao et al . (2017) ; Lima et al . (2016) ; Villanvea et al .(2019) and Kanagaraju & Rathnapraba .(2019)] .

Table(2) The effect of replacement the synthetic methionine and lysine with herbal in improvement the nutritive value of Turkish white sorghum in the diet of quail females on productive performance upon egg production(H.D%) , egg weight(g), egg mass , feed intake and(FCR) feed conversion ratio. (Meam±SD)

Treatments	Egg Production (H.D%)	Egg weight(g)	Egg mass(g)	Feed intake(g)	FCR
T1	82.19±3.25	11.42±0.30 abc	9.40 ± 0.61 ab	24.80 +1.02	2.661±0.15
T2	84.44±2.63	11.30±0.27 abcd	9.57± 0.52 ab	23.73±0.69	2.500±0.14
T3	85.48±1.67	11.24±0.24 abcd	9.63 ± 0.34 ab	24.37±0.72	2.540±0.12
T4	80.13±1.13	11.02±0.22 bcd	8.84 ± 0.24 ab	23.34±0.83	2.645±0.12
T5	86.63±1.41	11.81±0.30 a	10.24 ± 0.42 a	24.93±1.07	2.444±0.12
T6	80.69±2.61	11.08±0.11 abcd	8.96± 0.31 ab	24.17±0.88	2.705±0.13
F7	78.26±2.31	10.66±0.06 d	8.35 ± 0.27 b	23.02±0.35	2.766±0.11
T8	84.3±2.64	11.53±0.30 abcd	9.75 ±0.55 ab	24.23±0.61	2.507±0.15
T9	78.39±2.77	11.81±0.19 a	9.28 ±0.45 ab	23.36±0.57	2.532±0.12
T10	82.01±2.65	10.58±0.10 d	8.66 ±0.35 b	23.01±0.57	2.669±0.14
T11	80.19±3.54	11.14 ±0.28 abcd	8.99 ±0.69 ab	23.43±0.73	2.644±0.18
T12	80.69±2.91	10.68±0.07 cd	8.61 ±0.32 b	22.67±0.49	2.642±0.10
	NS	****	**	NS	NS

FCR: Feed conversion ratio.

abcd : Numbers with different superscripts differ statistically at $p \leq 0.05$

Table(3) The effect of replacement the synthetic methionine and lysine with herbal in improvement the nutritive value of Turkish white sorghum in the diet of quail females on productive performance upon protein intake, protein conversion ratio(PCR), methionine intake. methionine conversion ratio(MCR), lysine intake and lysine conversion ratio(LCR).(Meam±SD)

Treatments	Protein intake(g)	PCR	Methionine intake(mg)	MCR	Lysine intake(mg)	LCR
T1	5.00±0.20	0.535±0.02	11.16 ± 0.46 b	1.200±0.06 b	24.30±1.29 c	2.675±0.14 b
T2	4.78±0.13	0.500±0.03	10.86 ± 0.31 b	1.127±0.06 b	23.73±0.69 c	2.510±0.15 b
T3	5.02±0.14	0.522±0.02	10.96±0.32 b	1.152±0.05 b	24.37±0.27 c	2.562±0.12 b
T4	4.70±0.16	0.530±0.02	10.50±0.37 b	1.195±0.05 b	23.34±0.83 c	2.657±0.11 b
T5	5.20±0.21	0.492±0.02	11.21±0.48 b	1.102 ±0.06 b	24.93±1.07 b c	2.455± 0.13 b
T6	4.82±0.17	0.549±0.02	10.87±0.39 b	1.222±0.06 b	24.17±0.88 c	2.725±0.13 b
T7	4.90±0.07	0.587±0.02	10.36±0.16 b	1.125±0.05 b	23.02±0.35 c	2.782±0.11 a b
T8	5.14±0.13	0.535±0.03	10.90±0.27 b	1.140±0.07 b	24.23±0.61 c	2.535±0.16 b
T9	4.80±0.11	0.520±0.02	10.51±0.24 b	1.145±0.05 b	23.36±0.57 c	2.552±0.11 b
T10	4.73±0.15	0.547±0.03	12.42±0.40 b	1.447±0.08 a	27.61±0.90 a	3.220±0.17 a

T11	4.82±0.15	0.475±0.03	12.65±0.39 a	1.440±0.09 a	28.11±0.88 a	3.210±0.21 a
T12	4.66±0.10	0.542±0.02	12.65±0.26 a	1.427±0.05 a	27.21±0.59 a b	3.180±0.13 a
	NS	NS	**	**	***	**

PCR :Protein conversion ratio(gm protein /gm of egg).

MCR :Methionine conversion ratio(mg methionine /gm of egg).

LCR: Lysine conversion ratio (mg lysine/gm of egg).

abc : Numbers with different superscripts differ statistically at $p \leq 0.05$.

The cost of Feeding :

Results of experiments about the cost of feed per one kilo grime of produced egg shown in the Table 4. The lowest cost for the feeding were for T5(1.122 dollars) . by comparing with T1 (1.144 dollars).

Table 4. The effect of replacement the synthetic methionine and lysine with herbal in improvement the nutritive value of Turkish white sorghum in the diet of quail females on productive performance upon the feed cost /one kilo gram of egg produced (Meam±SD)

Treatments	Cost of 1000 kilo grams of feed(\$)	Cost of one kilo gram of feed(\$)	Feed conversion ratio	Feed cost for production of on kilo gram of egg
T1	434.12	0.434	2.638	1.144
T2	434.12	0.462	2.479	1.145
T3	486.31	0.462	2.530	1.229
T4	458.27	0.458	2.640	1.209
T5	461.07	0.461	2.435	1.122
T6	458.81	0.458	2.697	1.235
T7	482.60	0.482	2.756	1.328
T8	484.36	0.484	2.485	1.202
T9	482.43	0.482	2.517	1.213
T10	490.19	0.490	2.657	1.301
T11	490.37	0.490	2.606	1.276
T12	486.09	0.486	2.632	1.279

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