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EFFECT OF DIFFERENT LEVELS OF TRYPTOPHAN SUPPLEMENTATION ON GROWTH PERFORMANCE AND SOME BLOOD CONSTITUENTS OF SINAI BEDOUIN CHICKS

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SUMMARY

A total of one hundred and twenty, unsexed Sinai Bedouin chicks, one day old were used in this experiment. Chicks were allocated to four dietary treatments of thirty chicks which included three replicates of ten chicks. The experiment lasted for 16 weeks. Growth performance parameters, some blood parameters and economical efficiency were determined. The first group (T_1, control basal diet content normal level of tryptophan supplementation, $T_{2,}$ T_3 and T_4 contented the supplementation of tryptophan at the levels of 0.20,0.25 and 0.30%, respectively. Results were indicated that body weight and body weight gain were significantly ($P \leq 0.05$) increased by increasing of tryptophan level. The best of feed conversion ratio was recorded for treatment four supplied with 0.30% tryptophan compared with other treatments. Chicks fed diet supplemented with tryptophan were significantly increased in plasma glucose, Total protein and globulin concentration. No significant differences were noted in transaminase enzymes (ALT and AST) plasma blood concentration between all treatments. Significant decrease was observed in plasma total lipids and total cholesterol with adding tryptophan levels (0.20, 0.25 and 0.30%) compared with the basal diets. Tryptophan supplementation at levels (0.20, 0.25 and 0.30%) to chick's diet improved economical efficiency. In conclusion, supplementing tryptophan to Beduin Sinai chick's (during growth period) diet had a positive effect on growth performance and some blood constituents, especially addition 0.30% tryptophan could be recommended for improving Sinai Bedouin chick's health and economic efficiency.

Keywords: tryptophan, performance, blood constituents, Sinai Bedouin chicks.

INTRODUCTION

With progress in biotechnology, the cost of production of each amino acid has been significantly reduced, which has been one of the key factors in the expansion of use of amino acids in animal feed. Amino acids for feed now play very important roles in improving the efficiency of protein utilization in animal feeding Toride (2004). Proteins are made up of amino acids; these amino acids are generally referred to as the building blocks of proteins. They are about 20 comprising of 10 essentials and 10 non-essentials. The essential ones cannot be synthesized enough by the body, hence the need for them to be supplied in the diet, while the non-essential ones can be synthesized enough by the body Esonu (2006). One of the essential amino acids is tryptophan; others are arginine, histidine, leucine, isoleucine, lysine, methionine, phenylalanine, threonine and valine. Among others, tryptophan is often referred to as critical, as it is often difficult to supply in proper amount in feed protein (Oluyemi and Roberts (2007).

Tryptophan (Trp) is essential amino acids that must be obtained from diet. For all amino acids, including L-tryptophan, only the L isomer is used in protein synthesis and can pass across the blood-brain barrier (Takada and Otsuka, 2007) and Richard *et al.*, 2009). Its concentration in organisms is among the lowest of all amino acids (Emadi *et al.*, 2010) and it has relatively low tissue storage also Trp can be used for the feed additive which exerts the stress reducing effect in domestic animals (Swennen *et al.*, 2007). Trp is considered as a precursor of serotonin [5-hydroxytryptamine (5-HT)]. Serotonin (aneurotransmitter) has many functions in the central nervous system to inhibit aggression and modulates stress response, including social and environmental adaptability (Martin *et al*., 2000).

Melatonin is a metabolite in the serotonin pathway of tryptophan as an essential amino acid. Apart from being a structural component of all proteins it is a precursor for synthesis of two hormones, serotonin and melatonin. These hormones generally act in the classic check and balance mode with serotonin predominating during periods of activity (usually daylight) and melatonin predominating during periods of rest (usually nighttime). Tryptophan is an essential amino acid for chickens that is necessary for maximum growth and feed efficiency and it is a precursor of serotonin. Some previous studies have shown that dietary tryptophan levels could regulate feed intake, behavior, growth, immunity, protein synthesis and intestinal integrity of chicken (Corzo *et al.,* 2005 and Shen *et al.,* 2012a, b). Castro *et al.* (2000) observed that different levels of total tryptophan (0.18 to 0.24%) supplementation on diet of broilers from 1 to 21 days of age effect on weight gain and feed conversion ratio, estimating the requirements on 0.212 and 0.208% of total tryptophan. (Rosa and Pesti 2001, Fraiha 2002 and Tabiri *et al.,* 2002), reported that the level of 0.25% tryptophan supplementation is necessary to maximize feed intake. Duarte *et al.* (2013) noted that the level of 0.23% of digestible tryptophan numerically improves feed conversion.

Also, Hsia *et al.* (2005) indicated that showed that the feed intake, performance and were influenced by tryptophan content in the diet between 0.198% significantly better than in the 0.167%. Emmanuel *et al.* (2016) indicated that Chicks fed 0.24% dietary tryptophan gave the highest final body weight, average daily gain and better feed conversion ratio. (Ghosh *et al.,* 2007 and Mollaoglu *et al.,* 2007) observed that dietary supplementation of 0.27% of tryptophan under the high stocking density conditions, indicates that increased activities of GPT in plasma. Emadi *et al.* (2010) showed that the diet with increase of dietary Trp levels (0.10 to 0.20) had significantly improved albumin, total protein, glucose and decreased aspartate amino-transferase, triglyceride and cholesterol of broiler at 49 day of age. How ever, Wong *et al.* (2014) reported that increased dietary tryptophan significantly ($P \leq 0.01$) increasing total cholesterol in the plasma. The present study conducted to investigate the effect of feeding different levels of tryptophan supplementation on the performance traits and some plasma blood constituents and economical efficiency of Sinai Bedouin chick's during growth period.

MATERIALS AND METHODS

This experiment was conducted in the Poultry Research Farm and the Poultry Nutrition Laboratory, Faculty of Agriculture, Minufia University, Shebin El-kom, Egypt. The aim of this experiment was to study the effect of different levels of tryptophan on growth performance, blood plasma constituents and economic efficiency of Sinai Bedouin chicks under local environmental conditions.

One hundred and twenty, unsexed Sinai Bedouin chicks, one day old were used in the experiment. Flock history: Sinai Bedouin fowl is one of the Egyptian local strains. Chickens were characterized by laying fewer eggs which were smaller in weight. The first study was conducted by Arad *et al*. (1975) during the occupation of Sinai by Israel. This breed was compared to F1 crossbred from leghorn males X Sinai females. Additional information has been gathered concerning egg shell characteristic of the Sinai breed in comparison with White Leghorn as reported by Arad and Marder (1982 a). They concluded that Sinai egg shell is thicker and stronger than that of the Leghorn. The result of Arad and Marder (1982 b) reported that Sinai breed was more resistant to the extreme conditions of desert environment. Later on, Soltan *et al.* (1985) gave an economical study for this breed.

Soltan and El-Nady (1986) found that average body weights were 357.6, 486.6 and 711.6.9 for Sinai selected at 12, 16 and 20 weeks. Corresponding values for control line were 347.7, 510 and 717.7 g, in the same respective order. They added that viability of Sinai selected chickens were 94.2, 92.9, 92.5, 89.3, 83.6 and 83.3 % at 8-12, 12-16, 16-20, hatch -12, hatch-16 and hatch-20 weeks of age, respectively. Recently, Soltan *et al.* (2009) recorded BWSM of 1300.2 and 1123.0 g in the selected and control lines and they observed that the difference between both lines was not significant.

Chicks were wing banded, weighed and distributed into four dietary treatments of 30 chicks and divided into 3 replicates of 10 chicks. Chicks were reared in pens with litter (wheat straw) from 1 day to 16 weeks old of age under similar managerial and hygienic conditions. Feed and water were provided ad libitum during the experimental period. Artificial light was used to provide 24- hours / day photo period. The first group (T_1, control basal diet content normal level of tryptophan supplementation, $T_{2,}$ T_3 and T_4 contented the supplementation of tryptophan at the levels of 0.20, 0.25 and 0.30%, respectively. The diets (Table 1) with isocaloric and isonitrogenios based on National Research Council, NRC (1994) recommendation.

Table (1). Composition and chemical analysis of the experimental Sinai Bedouin chick's diets fed during the experimental periods.

Ingredient	Dietary treatment			
	T_1 Control	T_2	T_3	T_4
Ground yellow corn (8.9%)	67.87	67.85	67.83	67.82
Soybean meal (44%)	20.87	20.85	20.84	20.82
Wheat bran	7.76	7.75	7.73	7.71
Limestone , ground	1.87	1.87	1.87	1.87
Di-calcium phosphate	0.82	0.82	0.82	0.82
Vitamin and mineral mixture [2]	0.30	0.30	0.30	0.30
L- Lysine	0.10	0.10	0.10	0.10
DL-methionine[3]	0.14	0.14	0.14	0.14
L- Tryptophan[4]	-	0.05	0.10	0.15
Sodium chloride (salt)	0.27	0.25	0.25	0.25
Total	100	100	100	100
Calculated values[5]:				
Crude protein ,%	16.36	16.36	16.36	16.36
ME, Kcal/kg diet	2841	2841	2841	2841
C/P ratio	173	173	173	173
Lysine,%	0.84	0.84	0.84	0.84
Methionine,%	0.33	0.33	0.33	0.33
Tryptophan,%	0.15	0.20	0.25	0.30
Calcium,%	0.92	0.92	0.92	0.92
Av. phosphorus ,%	0.47	0.47	0.47	0.47

[1] T1; control; with supplementation normal tryptophan level, T2; control + 0.20%Trp.; T3, control + 0.25%Trp. andT4, control + 0.30%Trp.
[2]Vitamin and Mineral mixture at 0.30%of the diet supplies the following per kilogram of the diet: vit.A, 1200 IU; Vit.D3, 2500 IU; Vit. E, 10 mg; Vit .K3, 3mg; Vit.B1, 1mg; Vit.B2, 4mg; pant Nicotinic acid, 10 mg; Nicotinic acid, 20 mg; Folic- acid, 1 mg; Biotin, 0.05 mg; Niacin , 40 mg; Vit.B6, 3 mg, Vit. B12, 20 mcg; Choline Chloride, 400 mg; Mn, 62 mg; Fe, 44 mg; Zn, 56 mg; I, 1 mg; Cu, 5 mg and Se, 0.01mg.
[3]Dl-Methionine: 98% feed grade (contains 98% methionine).
[4]L-Tryptophan; 98% feed grade (contains 98% tryptophan).
[5]Calculated according to NRC (1994).

Body weights and Feed consumption of the chicks were recorded weekly. Body weight gain, feed conversion and economical efficiency were calculated. Performance index (PI) was calculated according to North (1984) as follow: PI=live body weight (kg) × 100 / feed conversion. Growth rates (GR) in different ages were calculated according to Brody (1945) as follow:

$$GR\ \% = \{(W2 - W1) / 0.5\ (W2+W1)\} \times 100$$

Where: Weight 1 = first weight Weight 2 = second weight

At the end of the experiment period, blood samples were collected from wing vein of six chicks from each treatment were randomly chosen. Blood samples were collected in heparinized tubes and plasma was separated by centrifugation at 3500 rpm for 15 min and frozen at -20 °c for the determination of glucose, glucose, total protein, albumin, and transaminases (ALT and AST) which were calorimetrically determined using commercial kits. The globulin values were obtained by subtracting the values of albumin from the corresponding values of total protein (Coles, 1974); also albumin / globulin ratio (A/G ratio) was calculated. Proximate analysis of representative samples from experimental diets was determined according to the methods of (AOAC, 2011).

The economic efficiency was calculated from the input – output analysis (Heady and Jensen, 1954) assuming that other head costs were constant, as follows: [(price of kg weight gain-feed cost /kg gain)/ feed cost /kg gain × 100] under local conditions. Data were statistically analyzed by the completely randomized design using the statistical software of SPSS 11.0 (2011) program and the differences among means were determined using Duncan's multiple range test (Duncan 1955). Percentages were transformed to the corresponding arcsine values before performing statistical analysis.

The following statistical model was applied:

$Y_{ij}=\mu + T_i + e_{ij}$,

Where: Y_{ij} = an observation,μ = Overall mean., T_i = effect of treatment (i = 1, 2, 3, 4) and e_{ij} = experimental random error.

RESULTS AND DISCUSSION

Data presented in Table (2) showed that the different levels of dietary Tryptophan (Trp) had a significant on body weight and body weight gain of Sinai Bedouin chicks during 1 – 16 weeks. It is clearly observed that the control group always had the lowest significantly BW and BWG throughout the experimental period. The birds fed diet contained 0.30 % Trp recorded the heaviest BW and BWG (843.88 and 807.77g.) compare to other dietary treatments T_2, T_3 and $T_{1,}$ control (BW: 803.13, 822.52 and 762.75; BWG: 766.58, 786.19 and 725.90g), respectively at 16 weeks of age. The current result was agreement with the results by (Emadi *et al.,* 2010; Shen *et al.,* 2012a, b and Patil *et al.,* 2013) who, concluded that dietary tryptophan might have positive effects on body weight gain, feed intake of the broiler chickens. However, Edmonds and Baker (1987) and El- Gogary (2014) who, indicated that increasing tryptophan level in the diet did not affected live body Wight and body weight gain.

Table (2). Effect of supplemental Tryptophan (Trp.) on body weight and body weight gain of Sinai Bedouin chicks during the experimental periods (Mean ± SE)[2].

Age weeks	Dietary treatments[1]			
	T_1 Control	T_2	T_3	T_4
	Body weights (g)			
One – day	36.85 ± 0.54	36.55± 0.48	36.33± 0.55	36.11± 0.47
4Wk	157.65 ±6.33^d	162.29±10.11^c	169.36± 4.25^b	170.58±19.90 ^{a}
8Wk	331.01 ±15.23^d	348.08±22.02^c	364.92±13.20^b	380.08±4.55^a
12Wk	498.02 ±6.50^d	521.25± 5.41^c	539.25±6.66^b	560.08±4.32^a
16Wk	762.75 ±11.23^d	803.13±7.75^c	822.52±15.10^b	843.88±11.19^a
	Body weight gain (g)			
0 – 4 Wk	120.80± 7.55^c	125.74±6.53^b	133.03±7.11^a	134.47±7.92^a
4 – 8 Wk	170.67±10.04^d	181.71±19.22^c	187.06±12.83^b	198.32±11.25^a
8 – 12Wk	172.39±3.22^d	185.33±6.56^c	191.33±4.26^b	202.35±7.19^a
12 – 16Wk	267.42±4.63^d	289.96±11.30^c	296.77±9.53^b	311.28±12.11^a
0 – 16Wk	725.90±7.02^d	766.58±6.91^c	786.19±5.44^b	807.77±7.11^a

[1]*T1; control; with supplementation normal tryptophan level, T2; control + 0.20%Trp.; T3, control + 0.25%Trp. andT4, control + 0.30%Trp.*

[2] *means ± SE of 3 replicates / treatment.*

[3]*a, b, c and ….etc: means within the row with each different superscript are significantly different (P ≤ 0.05).*

N.S: Non significant

Results in Table (3) showed that chicks fed supplemented diets significantly consumed more amount of feed compared to the chicks fed control diet with fed different levels of fiber during the growing periods (Table 3). The birds fed diet contained 0.30% Trp. recorded significantly ($P \leq 0.05$) the highest as compared to the control and other groups being 2408.54, 2250.34, 2317.34 and 2363.58g for $T_{4,}$ $T_{1,}$ T_2 and T_3, respectively. While birds fed diet contained 0.30% Trp significantly ($P\leq0.05$) recorded better feed conversion ratio (2.98) compared to the control (3.10). There was a trend that feed intake increased with increasing level of tryptophan by the results confirmed the pervious findings of several researches Harms and Russell (2000); Peganova and Eder (2003); Hsia *et al.*(2005) and Rostagno *et al.* (2005).

Also Corzo (2012) reported that Body weight gain, feed consumption, and feed conversion responses of Cobb 500 male broiler chicks fed increasing dietary ratios of Tryptophan: Lysine (19.5 and 19.7% %) from 0 to 18 d post hatch. (Patil *et al.,* 2013; Duarte, *et al.,* 2013 and Wong *et al.,* 2014) who found that supplementation tryptophan level of broiler diet improvement in feed conversion ratio of birds.

Emmanuel *et al.* (2016) found that chicks fed 0.15% total dietary tryptophan had significantly higher (p<0.05) value for feed intake (1,789.90 g).

Table (3). Effect of supplemental Tryptophan (Trp.) on feed intake and feed conversion ratio Sinai Bedouin chicks during the experimental periods (Mean ± SE)[2].

Age (week)	Dietary treatment[1]			
	T_1 Control	T2	T3	T4
	---------------------feed intake, FI (g/bird) --------------------------			
0 – 4 Wk	291.13 ± 3.25[d]	296.75± 2.98[c]	305.97±3.33[b]	307.22±3.08[a]
4 – 8 Wk	443.74± 2.12[d]	466.99± 3.96[b]	443.26±2.85[c]	483.90±4.47[a]
8 – 12 Wk	558.11± 9.63[d]	563.00±3.65[c]	606.07± 7.11[b]	618.76±4.52[a]
12 – 16 Wk	957.36± 11.23[d]	990.60± 9.81[c]	1008.28±12.30[a]	998.66±11.41[b]
0 – 16 Wk	2250.34±10.50[d]	2317.34±12.39[c]	2363.58±11.58[b]	2408.54±12.01[a]
	--------------feed Conversion, FC (g feed/g gain) --------------------			
0 – 4 Wk	2.41± 0.04[a]	2.36± 0.04[b]	2.30± 0.33[b]	2.28±0.03[a]
4 – 8 Wk	2.60±0.05[c]	2.57± 0.05[b]	2.53± 0.05[b]	2.44± 0.03[a]
8 – 12 Wk	3.24±0.04[c]	3.03±0.05[a]	3.17±0.01[b]	3.05±0.03[a]
12 – 16 Wk	3.58±0.03[c]	3.42±0.04[c]	3.39± 0.06[b]	3.21± 0.02[a]
0 – 16 Wk	3.10±0.02[d]	3.02±0.02[c]	3.01±0.01[b]	2.98±0.03[a]

[1] T1; control; with supplementation normal tryptophan level, T2; control + 0.20%Trp.; T3, control + 0.25%Trp. andT4, control + 0.30%Trp.
[2] means ± SE of 3 replicates / treatment.
[3]a, b, c and ….etc: means within the row with each different superscript are significantly different (P ≤ 0.05).
N.S: Non significant

On the other hands, Rosa *et al.* (2001) and El- Gogary (2014) showed that increasing L- tryptophan level in the diet did not affected feed conversion ratio. However, feed intake decreased significantly with L- tryptophan at 0.75 and 1.0 g /kg diet. Results on performance index (P.I.) and growth rate (G.R)

Table (4) showed significant differences (P ≤ 0.05) as influenced by dietary different levels of tryptophan to Sinai Bedouin chicks at 8 and 16 weeks. This effect could be due to the function of tryptophan as a precursor of the neurotransmitter serotonin. It is well know that serotonin, feed consumption of animals Shea-Moore *et al.* (1996) and Peganova and Eder (2003).

Table (4). Effect of supplemental Tryptophan (Trp.) on performance index (PI.) and growth rate (GR.)of Sinai Bedouin chicks during the experimental periods (Mean ± SE)[2].

Age (week)	Dietary treatments[1]				
	T_1 Control	T_2	T_3	T_4	Sig
	--------------------------- Performance index (PI., %) ------------------				
8wk.	65.60 ±1.16[c]	70.72± 1.64[ab]	73.95± 2.35[b]	81.33±1.08[a]	*
16Wk.	74.75 ±2.22[d]	84.80±3.68[c]	87.82±1.34[b]	95.81±1.12[a]	*
	----------------------- Growth rate (GR.%) ----------------------------				
8 Wk.	46.22± 0.13[bc]	49.19±1.02[c]	51.94±0.68[b]	55.00±0.60[a]	*
16 Wk.	72.16±1.98[d]	78.78±2.20[c]	82.50±3.12[b]	86.39±1.56[a]	*

[1] T1; control; with supplementation normal tryptophan level, T2; control + 0.20%Trp.; T3, control + 0.25%Trp. andT4, control + 0.30%Trp.
[2] means ± SE of 3 replicates / treatment.

[3]a, b, c and ….etc: means within the row with each different superscript are significantly different (P ≤ 0.05). N.S: Non significant

Results of blood constituents as affected by different levels of tryptophan are summarized in Table (5). It is clear that chicks fed diet containing tryptophan at level 0.30% (T_4) had the significantly higher glucose, total protein and albumin concentration, and lower total lipids, and total cholesterol comparing with those fed the control diet. However, here is no significant difference among treatments in blood components representing liver function (as measured by ALT and AST).

Table (5). Effect of supplemental Tryptophan (Trp.) on some blood plasma constituents of Sinai Bedouin chicks (Mean ± SE)[2].

Item	Dietary treatment[1]				Sig
	T_1 Control	T_2	T_3	T_4	
Glucose, mg/Di	151.34±1.20[d]	167.86±1.29[c]	183.56±1.17[b]	189.83±1.37[a]	*
Total lipids, mg/dl	523.19±1.19[a]	483.27±0.33[b]	467.00±0.86[c]	413.66±0.49[d]	*
Total cholesterol, mg/dl	175.36±1.02[a]	161.82±0.15[b]	154.33±0.05[c]	139.26±1.12[d]	*
Total protein, g/dI	4.13±0.04[d]	4.25±0.05[c]	4.33±0.05[b]	4.39±0.05[a]	*
Albumin (A), g/dl	2.28±0.03[d]	2.35±0.05[c]	2.38±0.04[b]	2.41±0.01[a]	*
Globulin (g), g/dl	1.85±0.02[c]	1.90±0.09[ab]	1.95±0.01[a]	1.98±0.03[a]	*
A / G ratio	1.23b±0.02	1.24a±0.04	1.22ab±0.04	1.22ab±0.02	*
ALT (U/L)	14.18±0.03	14.08±0.02	14.00±0.02	13.62±0.01	NS
AST (U/L)	40.18±0.01	38.62±0.01	38.41±0.01	38.10±0.01	NS

[1] T1; control; with supplementation normal tryptophan level, T2; control + 0.20%Trp.; T3, control + 0.25%Trp. andT4, control + 0.30%Trp.

[2] means ± SE of 3 replicates / treatment.

[3]a, b, c and ….etc: means within the row with each different superscript are significantly different (P ≤ 0.05).

N.S: Non significant

The obtained results confirmed the previous findings of several researches (Ghosh *et al.*, 2007; Mollaoglu *et al.*, 2007 and Emadi *et al.*, 2010).Wong *et al.* (2014) observed that tryptophan supplementation had positive effects on concentration of albumin, total protein, and glucose; however, dietary tryptophan had decreased of cholesterol and triglyceride of the broiler chickens and no effects on serum aspartate amino-transferase (AST) and alkaline phosphatase (ALT) at 27 to 49 day of age. El-Gogary (2014) showed that increasing L- tryptophan level in the diet at 0.75 and 1.0 g /kg had no effects on plasma total protein and glucose. However plasma cholesterol levels decreased significantly ($P \leq 0.05$) with L- tryptophan Supplementation and lowest levels occurred at 0.25 g /kg.

Birds with higher body weight were observed to have a higher concentration of blood plasma total protein when compared with the lighter broilers, possibly associated with higher demand for lean tissue maintenance and turn over (**Corzo *et al.*, 2005).** The economic efficiency of the experimental treatments (Table 6) indicates that the highest economic and relative economic efficiency values were obtained with the diet supplemented with graded levels of tryptophan. It may be due to better feed conversion of birds received the experimental diets. In conclusion, under our experimental condition, supplementing tryptophan to Sinai Bedouin chick's (during growth period) diet had a positive effect on growth performance and some blood constituents, especially addition 0.30% tryptophan could be recommended for improving Sinai Bedouin chick's health and economic efficiency

Table (6). The economic efficiency of the experimental diets as effected by different levels of tryptophan (Trp) supplementation.

Item	Dietary treatment[1]			
	T_1 Control	T_2	T_3	T_4
Initial body weight gain, (g)	36.85	36.55	36.33	36.11
Final body weight, (kg)	763	803	823	844
Body weight gain. (kg)	726	766	787	808
Total revenue (L.E)[2]	18.15	19.15	19.67	20.20
Feed intake (Kg)	2.25	2.32	2.36	2.41
Price of Kg feed (L.E)	6.20	6.21	6.23	6.24
Feed cost (L.E)	13.95	14.41	14.70	15.04
Net revenue (L.E)[3]	4.20	4.74	4.97	5.16
Economic efficiency, (%)[4]	30.11	32.89	33.80	34.31
Economic efficiency relative (%)	100	109	112	114

[1] T1; control; with supplementation normal tryptophan level, T2; control + 0.20%Trp.; T3, control + 0.25%Trp. andT4, control + 0.30%Trp.
[2] Total revenue = Body weight gain (Kg) x Price of one – Kg live body weight.
- Assuming the price of one – Kg live body weight was 25E (according to Egyptian market, 4 / 2017).
[3] Net revenue = Total revenue – Feed cost.
[4] Economical efficiency = (Net revenue / Feed cost) x 100.

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تأثير اضافة مستويات مختلفة من التربتوفان فى علائق كتاكيت سينا البدو على الأداء الإنتاجى وبعض صفات الدم خلال فترة النمو

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اجريت هذه الدراسة فى مزرعة أبحاث الدواجن ـ قسم إنتاج الدواجن - كلية الزراعة ـ جامعة المنوفية ، وذلك بهدف دراسة تأثيرمستويات مختلفة من التربتوفان على على الأداء الإنتاجى وبعض صفات الدم لكتاكيت سينا البدو تحت الظروف الطبيعية المصرية. استخدم فى هذه الدراسة عدد 120 كتكوت سينا البدو غير مجنس عمر يوم , تم تقسيمها عشوائياً إلى 4 معاملات تجريبيه, قسمت كل معاملة إلى 3 مكررات بكل منها 10كتاكيت. غذيت كتاكيت المعاملة الأولى (الكنترول) على العليقة الأساسية بينما غذيت كتاكيت المعاملة الثانية والثالثة والرابعة على العليقة الأساسية مضافا اليها التربتوفان بمستويات 0.20 و 0.25 و0.30 % على التوالى. وانتهت التجربة عند عمر 16 أسبوع وتم تقدير الأداء الإنتاجى للطيور وبعض صفات الدم والكفاءة الإقتصادية.

وأوصت النتائج على أنة بإضافة المستويات المختلفة من الحمض الأمينى التربتوفان إلى العليقة الأساسية أثرت معنوياً لزيادة وزن الجسم ومعدل الزيادة فى وزن الجسم وخاصتاً بزيادة مستويات التربتوفان. كم سجلت النتائج أيضاً أن الطيور المغذاة على المعاملة الرابعة المضاف لها 0.30% تربتوفان أعطت أفضل معدل تحويل غذائى وتحسن معدل النو وكذلك الدليل الانتاجى خلال فترة التجربة. كما لوحظ أنة بزيادة إضافة مستوى التربتوفان فى علائق كتاكيت سيناء أدت إلى زيادة معنوية فى كلاً من تركيز الجلوكوز،البروتين الكلى, والألبيومين والجلوبيولين وانخفاض مستوى الدهون الكلية والكوليسترول فىبلازما الدم . وتحسنت الكفاءة الاقتصادية عند مستوى 0.30% تربتوفان. ونستخلص من ذلك أن إضافة الحمض الأمينى التربتوفان فى علائق كتاكيت سيناء البدو خلال فترة النمو له تأثير ايجابى على النمو والأداء الإنتاجى حيث كانت أفضل النتائج لوحظت للطيور المغذاه على 0.30% تربتوفان من الناحية الصحية والاقتصادية .