Zagazig J.Agric. Res., Vol .31 No.(3) 2004 **1011-1024**

EFFECT OF DIETARY PROTEIN LEVEL AND DL-METHIONINE SUPPLEMENTATION ON THE PERFORMANCE OF BROILERS DURING THE FINISHER PERIOD.

Sonbol. S.M.* and I.A.Azazi**

*Dep. of Poultry Prod., Faculty of Agric. Zagazig Univ., Zagazig.Egypt
**Animal Production Institute, Dokki, Giza, Egypt.

Accepted 8 / 2 / 2004

ABSTRACT : A total number of 320 unsexed Hubbard broiler chicks of 21 days old were divided into 8 expermental groups (2 × 4 factorial arrangements). The first four groups were fed a high dietary protein level (19.82% crude protein "CP") and the other groups were fed on adietary lower finisher crude protein level (17.80% CP) from 21 to 42 days of age. Synthetic DL – methionine was supplemented at levels of 0.00, 0.05, 0.10 and 0.15% to each protein level.

Results obtained indicated that, live body weight,weight gain, feed conversion and feed cost/Kg gain were improved during the expermental periods for chicks fed high dietary CP level. However, protein efficiency ratio (PER) was similar for all treatments during the experimental period. Live body weight, weight gain, feed intake , feed conversion, PER and feed cost/Kg gain were improved for the diets supplemented with 0.10 % synthetic methionine . The best live body weight, wight gain, feed conversion and feed cost/Kg gain were recorded for chicks fed a high protein finisher diet supplemented without synthetic methionine during the period from 21 – 42 days of age of age. While, feed intake and PER were improved as the dietary protein level decreased and supplemented with 0.1% synthetic methionine during this period. The dietary CP level supplemented with synthetic methionine had a significant ($P < 0.05$) effect on carcass, liver, dressing, feather and abdominal fat.

KEY WORDS: Protein, DL-methionine, Performance, Carcass, Broiler .

INTRODUCTION

Protein is the most expensive nutrient and must be provided from a high quality sources. The most common materials in broiler rations are plant products such as maize, soyabean meal, rice or wheat bran.

Dietary protein level must be provided with sufficient levels of essential amino acids to allow maximum protein synthesis and meet the demands of metabolic processes.

Methionine and lysine are generally low in plant products. Animal protein products such as fish meal, meat and bone meal etc. are good sources of the most essential amino acids (EAA) but they are usually more expensive than plant protein ingredients. Synthetic methionine and lysine are usually added to the diets to balance the amino acids composition.

Many investigators concluded that broiler chicks fed on low protein diets supplemented with essential amino aicds could perform equivalently to those fed on high protein diets (Han et al., 1992; Deschepper and De Groote, 1995 and El-Sherbiny et al., 1997). However, Boomgaardt and Baker, 1971, 1973, Robbins, 1987, Morris et al.,1987 indicated that the requirement of some of the EAA is directly related to protein concentration.

Some authers recomended starter diets with at least 24% crude protein and finisher diets with at least 20.5 %CP (Moran, 1980, EL-Moghazy et al., 1982 and Salman at el., 1983). Other authors recommended a finisher diets with only 15-19% crude protein (Proudefoot and Hulan, 1978). On the other hand, the total sulpher amino acid (TSAA) requirements for broiler chicks has been the subject of many researchers in both laboratory and practical situations.

Estimates of TSAA requirement of broiler chicks during the starting and growing period were 0.93 and 0.72%, respectivly (NRC, 1984). In addition, the dietary factors includiong the levels of protein and genetic factor may be influenced the apparent methionine of chicks (Babatunde et al., 1976, and Mushart and Latshaw, 1985).

The present study was under taken to investigate the effect of varying dietary protein levels and methionine supplementation on growth performance and carcass characteristics of broiler chicks during the finishing period.

MATERIALS AND METHODS

A total number of 320 unsexed 21 days Hubbard were divided into 2 × 4 factorial arrangements. The two groups were fed on a finisher diets which contain 19.82 and 17.8% CP. Each group was divided into four sub-treatment groups (40 birds in each) and supplemented fed with 0.0, 0.05, 0.10 and 0.15 % synthetic DL-methionine level.The experimental finisher basal diets were formulated to contain TSAA at a level of 0.78 % or 0.72 % for high or low protein diets,respectively, (Table 1).

Feed and water were supplied *ad-libitum* and chicks were kept under the same managerial conditions during the experimental periods. Chicks were individually weighed and feed consumption was weekly recorded for each treatment to the nearst gram and feed conversion was calculated as units of feed consunption per units live weight gain for each experimental group. At 42 days of age (end of experiment), a slaughter test was carried out on 4 birds of each treatment to estimate some carcass measurements (liver, dressing, feather, abdominal fat and carcass weights as, percentages of live weight).

The statistical analyses were carried out according to Senedecor and Cochran (1982). Percentage values were transformed to arcsin values before the statistical analysis. Duncan's New multiple range test (1955) was used for comparisons among the significant means.

RESULTS AND DISCUSSION

Growth performance :

Results obtained for the live body weight during (LBW) the experimental periods are shown in Table 2. Regardless to dietary synthetic methionine effects, the chicks fed a high protein diet (19.82 %) showed the significant ($P<0.05$) heavier (LBW) compared with those fed a lower protein diet (17.80%) at 28,35 and 42 days old. Irrespective of dietary protein levels, statistical analysis showed a significant ($P<0.05$) effect of 0.05% dietary synthetic methionine supplementation on body weight at 28 or 35 days of age. However, the differences in body weight at 42 days of age were insignificant ($P<0.05$). Also, interaction showed that the best live body weight was recorded for the chicks fed low protein diet supplemented with 0.1 % synthetic methionine at 42 days of age. However, chicks fed high protein

diet without synthetic DL – methionine supplementation showed highly significant increase in live body weight as compared with the other treatment groups.

These results were in agreement with the recommendation of Hargis and Greger (1980), Prasad (1980), EL Moghazy et al. (1982), Summers and Lesson (1985), Sonbol (1990) and Gongnet et al., (1995) who showed that increasing dietary protein levels improved body weight and feed conversion. It also agreed with Holsheimer and Janssen (1991) who showed that body weight of broiler chicks decreased when the diet had inadequate or excess methionine. Babatunde et al., (1976) who found that weight gain of broiler chicks was improved as dietary protein level increased and that increased methionine content improved N retentain. However, the optimun levels of TSAA during the growing period (21 – 42 days) were 0.78 and 0.72 for both levels of CP respectively . These results were in agreement with those reported by ARC (1975). Damron et al., (1977). Wheeler and Latshow (1991), NRC (1984 and 1994) and Summers and Leeson (1985) who showed that the optimum level of TSAA for broiler chicks during the finisher period was between 0.70 and 0.78 %.

The results concerning the effect of dietary protein level and synthetic methionine supplementation on the weight gain (g), feed intake (g), feed conversion, PER and feed cost /Kg gain are shown in Table 3.

Regardless the dietary synthetic DL-methionine supplementation, broilers chicks fed on high protein diet (19.82 %) at 42 days of age revealed improvement in weight gain, feed conversion and feed cost /Kg gain in comparison with chicks fed low protein diet (17.80%). protien efficiency ratio for both levels of protein during the finisher period were similar (1.81 g weight gain/g protein consumed for high and low CP).

Regardless the dietary protein levels, the best weight gain, feed intake, feed conversion, PER and feed cost/Kg gain were recorded for chicks fed a finisher diet supplemented with 0.1 % synthetic methionine as compared with other groups. Also, interaction showed that the best weight gain, feed conversion and feed cost / Kg gain were recorded for chicks fed a high protein diet not supplemented with synthetic DL - methionine. However, chicks fed a high protein diet with 0.1 % synthetic DL – methionine supplementation showed improvement in feed intake and PER as compared with other groups.

The results of feed intake are in agreement with those obtained by Olomu and Offion (1980). On the other hand, Plavink and Bornstein (1978) found that chicks during the finishing period tended to increase their feed intake to maintain normal growth, when protein is limiting the results of feed conversion are in agreement with those obtained by Fancher and Jensen (1989) who found that feed efficieney improved by increasing dietary protein level. Gongnet et al., (1995) reported that the least favourable feed conversion was in feeding 20% (CP).Sonbol and Habeeb (1991) showed that feed conversion during the finisher period were 2.38 and 2.33 g feed/g gain for the chicks fed a finisher supplemented with 0.0 and 0.1% methionine, respectively. El-Hindawy (1992) found that, chicks fed on diet with 0.2% DL – methionine showed better PER (2.5) than those fed on no supplemented diet .

Carcass characteristics :

The effects of experimental treatments on carcass treats are showed in Table 4. Regardless the dietary synthetic DL- methionine supplementation, dietary protein levels affected significantly ($P<0.05$) on carcass%, dressing %, feather% and abdominal fat %. Carcass % , dressing % and feather % increased significantly as dietary protein increased. While, liver % abdominal fat % decreased as dietary CP increased.

Regardless dietary protein levels, the feather and abdominal fat percentages of broilers fed dits without synthetic DL-methionine were significantly ($P<0.05$) lower and higher, respectively than those fed diets with synthetic DL-methionine. In addition, methionine supplementation showed insignificant effect on carcass, liver and dressing percentages.

The interaction between dietary protein levels and synthetic methionine supplementation is also presented in Table 4 which showed that the percentage carcass and dressing of broilers fed diets contained high protein without synthetic DL-methionine supplementation were significantly ($P<0.05$) higher than he other groups. Also, the percentage of liver and feather were significantly ($P< 0.05$) improved with broilers fed the diet contained 19.82% protein with 0.05% synthetic DL– methionine supplementation. Besides, the percentage of abdominal fat of broilers fed diets contained 17.8% CP without synthetic DL methionine was insignificantly ($P< 0.05$) higher than those in broilers fed 19.82% CP with or without synthetic DL-methionine (Table 4).

These results are in agreement with those obtained by Prasad and Sadagopan (1976) who showed that methionine did not affected carcass % but decreased fat content of the carcass. Also, Marino and Woodroof (1966) Lipstein et al. (1982), Fancher and Jensen (1989), Sonbol (1990), Sonbol and Habbeb (1991 a), and Moran et al (1992) who who showed that increasing dietary protein level decreased significantly abdominal fat percentage. However, Sonbol (1990) and Shehata (1995) found that feather weight % increased significantly as ditary methionine increased .

In conclusion, it could be recommended that synthetic DL-methionine supplementation to low protein diet showed the best improvement with (17.8 %CP) compared with other treatment with low protein level. While, the high protein one without synthetic DL- methionine gave a remarked improvemment with (19.82%) under the same sulpher amino acid level.

REFERENCES

Agriculture Research Council 1975. The nutrient requirements of farm livestock. No. 1. poutry technical reviews and summaries. Agr. Res. Council, London.

Babatunde, G.M, B.L. Fetuga, and E. Kassin. 1976. Methionine supplemtation of low protein diets for broiler chicks in the tropics. Br. Poult. Sci., 17 : 463-469 .

Boomgaardt, J, and D.H. Baker 1971. Tryptophan requirement of growing chicks as affected by dietary protein level. J. Anim. Sci., 33: 595-599 .

Bgoomgaardt, J, and D.H. Baker 1973. Effect of age on the lysine and sulfur amino acid requirements of growing chickens. Poult. Sci., 52:592-597.

Damron, B.L., R.H. Harms, A.S. Arafa and D.M. Janky 1977. The effect of dietary iasalocide or monensin in the presence of roxarsone and graded methionine levels on broiler performance and processing characteristics Poultr Sci., 56, (5):1487- 1491.

Deschepper, K. and G. De Groote, 1995. Effect of dietary protein. essential and non essential amino acids on the performance and crcass composition of male broiler chickens. Br. Poult. Sci., 36 : 229-245

Duncan, D.B., 1955. Multiple range and multiple F tests. Biometrics, 11:1-42.

EL-Hindawy, M.M. 1992.Additive effect of DL-methionine and some growth promoting antibiotics in broiler. Zagazig J. Agric. Res. Vol. 19(1):243-260.

EL-Moghazy, M.S.A. EL Boushy, A.R and Ketelaars, E.H 1982. Effect of dietary level of protein and energy with constant methionine and lysine supplemented ratio. Research Bulletin. Faculty of Agriculture Ain shams Univ., No. 2034, pp 18.

El-Sherbiny, A.E., M.A. Mohamed, A.S. Hamza and T.M EL- Afifi 1997. Response of broiler chicks to low protein diets supplmented with lysine and methionine Egypt Poult Sci., 17, 23-38 .

Fancher, B.I. and L.S Jensen. 1989. Dietary protein level and essential amino acid content : influence upon female broiler performance during the finisher period. Poult. Sci., 68, 897-908.

Gongnet, G.P; S. Sakande; R. Parigi-Bini and M.B. Hane 1995. Influence of dietary protein on growth and carcass yield of guineafowl (Numida meleagris) and broiler chikens (Gallus domesticus) in a tropical area. Revue Medecine vetrinairy 146 : 3, 199-208.

Han Y.; H. Suzuki; C.M. Parsons and D.H. Baker 1992. Amino acids fortification of a low protein corn soybean meal diet for chicks. Poult. Sci., 71-1168-1178.

Hargis, P.H. and C.R. Greger. 1980. Effect of varing dietary protein and energy levels.on growth rate and body fat of broiler. Poult Sci,. 59(7)1499-1504.

Holsheimer, J.P. and W.M.M.A. Janssen. 1991. limiting amino acid in low protein maiz-soybean meal diets fed to broiler chicks from 3 to 7 weeks of age. Br. Poult. Sci., 32 :151-158.

Lipstein, B; S. Bronstein and I. Batov. 1982. The replacement of some of the soybean meal by the first- limiting amino acids in practical broiler diet. 3. Effect of protein concentrations and amino acid supplementation in broiler finisher diets on fat deposition in the carcass. Br. poult. Sci,. 16:627-635.

Marino, J.E. and J.E. Woodroof. 1966. Composition and stability of broiler carcasses as affected by dietary protein and fat. Poult. Sci., 54-247.

Moran, E.T. Jr. 1980. Early protein restriction of the broiler chicken and carcass quality upon later marketing .Poult Sci., 59:379-382.

Moran, E.T., Jr; Bushong, R.D. and Bilgili, S.F. 1992. Reducing dietary crude protein for briolers while satisfying amino acid requirements by least-cost formulation : live performance litter composition and yield of lost-food carcass cuts at six weeks Poult .Sci., 71:1687-1694.

Morris, T.R; I.A.I. Azzawi; R.M. Gous and G.L.Simpson.1987. Effect of protein concentration on responses to dietary lysine by chicks. Br. Poult. Sci., 28:185-195 .

Mushart, N.A. and J.D. Latshaw. 1985. Broiler chicken performance as affected by protein levels, amino acid levels and plant protein supplementation, Nutr. Re. Int. 32 : 583-596.

National Research Council, 1984. Nutrient Requirements of poultry. 8th ed. National Academy press. Washington, DC.

National Research Council, 1994 Nutrient Requirements of poultry. 9th. ed. National Academy press, Washington, DC.

Olomu, J.M. and .S.A. Offion. 1980. The effects of different protein and energy levels and time of change from starter to finisher rations on performance of broiler chickens in the tropices. Poult. Sci., 59:828-835.

Plavnik, Y. and S. Bornsntein. 1978. The sparing action of inorganic sulphate on sulphur amino acid in practical broiler diets. Replacement of som the supplementary methionine in broiler finisher diets. Br. Poult. Sci., 19:159-167.

Prasad, A. 1980. A note on the effect of feeding supplementes fat and methionine on processing losses of broilers. Indian Veterinary Journal. 57 (2), 152-154.

Prasad, A. and V.R. Sadagopan 1976. Effect of supplemental methionine in broiler. diets on dressing percentage and carcass composition. Indian Journal of nutrition and diets 13 (12), 206-40.

Proudefoot, F.G. and H.W. Hulan 1978. The interrelated effects of feeding diet combination with different protein and energy levels to males and females of commercial broiler genotypes. Canadian Journal of Anim. Sci., 58: 391 – 398.

Robbins, K.R. 1987. Theronine requirement of the broiler chicks as affected by protein level and source. Poult. Sci., 66, 1831-1534.

Salman, R.E.; H.L. Classen, and P.K. McMillan. 1983. Effect of starter and finisher protein on performance, carcass grade, and meat yield of broiler. Poult Sci., 60 : 2519 – 2528.

Senedecor, G.W. and G.W Cochran, 1982. Statistical methods. The low state university press, ames, lowa.

Shehata, .A.S.A. 1995. Productive performance of growing broiler chicks as affacted by energy / protein ratio and methionine level ph. D. Thesis. Fac. Agric. Zagazig. Univ., 1995.

Sonbol, S.M., 1990. Effect of dietary protein and methionine levels on performance, carcass measurements and blood constituents of broiler chicks Egypt poultry Sci., 11:17-34.

Sonbol, S.M. and A. Habeeb 1991a. Effected of dietary energy, methionine, choline and sulfate levels on productive performanc and some blood constituents of broiler chicks during the growing periods. Egypt. J. Appl. Sci., 6(3):310:328.

Sonbol, S.M and A. Habeeb. 1991b. Effected of starter and finisher protein levels on performance and some blood constituents of broiler chicks. Egyptain. Poult. Sci, H, 1-15.

Summers, J.D, and S. Leeson. 1985. Broiler carcass composition as affected by amino acid supplementation. Can. J. Anim. Sci., 65,3,717-723.

Wheeler, K.B. and J.D. Latshaw 1981. Sulfur amino acid requirements and interasction in broilers during two growth periods. Poult. Sci., 60(1)-228-238.

Table (1): Composition and calculated analysis of the expermintal finisher diets .

Ingredients	Experimental finisher diets % (21 – 42 days)							
	High protein				Low protein			
	1	2	3	4	1	2	3	4
Yellow corn	63.33	64.41	66.01	67.35	65.33	67.41	68.49	70.60
Soyabean meal 44%	5	12	18.5	25.2	-	6	13	19
Meat meal 55%	5	5	5	5	5	5	5	5
Corn gluten meal 60%	12	8	4	-	12	8	4	-
Wheat bran	12	8	4	-	15	11	7	3
Premix*	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Salt	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Bone meal	1.20	1.35	1.50	1.70	1.20	1.35	1.50	1.65
Limestone	0.45	0.3	0.15	-	0.45	0.3	0.15	-
Methienine	-	0.05	0.10	0.15	-	0.05	0.10	0.15
Lysine	0.42	0.29	0.14	-	0.42	0.29	0.16	-
Total	100	100	100	100	100	100	100	100
Caluctaed analysis**								
Crude protein %	19.82	19.82	19.82	19.82	17.8	17.8	17.8	17.8
Kcal ME/Kg feed	2960	2940	2938	2930	2960	2960	2960	2960
C/P rito	149	148	148	148	149	149	149	149
Calcium %	0.95	0.97	0.98	0.96	0.94	0.96	0.97	0.97
Total phosphorus %	0.72	0.73	0.73	0.73	0.73	0.74	0.74	0.74
Lysine	1.06	1.06	1.06	1.06	0.94	0.94	0.94	0.94
Lysine %of protein	5.35	5.30	5.25	5.35	5.28	5.28	5.28	5.28
Methionine + Cystine	0.78	0.78	0.78	0.78	0.72	0.72	0.72	0.72
M+C of protein	3.94	3.94	3.94	3.94	4.04	4.04	4.04	4.04
Cystine %.	0.37	0.36	0.35	0.34	0.35	0.34	0.33	0.32

* Each Kg of Vit and Min . Permix contain ; V.A 12.000.000 Iu . Vit . D_3 2.000.000 IU, Vit E 10 g , Vit K_3 2 g , Vit B_1 . 1 g . Vit B_2 5g . Vit B_6 1.5g . Vit B_{12} 10 mg . Niacin 30 g , Pantothenic 10g , folic acid 1g , Biotin 50 mg . Choline. chloride 260g Iron 30 g . copper 10 g . Zinc 50 g . Manganese 60 g . Iodine 1g , Selenium 0.1g , Cobalt 0.1 g .

** According to NRC (1994).

Table (2). Live weight (g) as affected by dietary protein levels and DL – methionine supplementation .

Items	Age in days			
	Initial (21 days)	28	35	42
P_1(19.82%)	689.13± 0.36	951.06±5.15a	1229.92±15.19a	1637.35±20.74a
P_2 (17.8%)	683.42 ± 0.56	914.59 ± 18.24b	1180.68±26.49b	1511.22 ± 21.95b
M_1 (0.0%)	686.63±3.00	908.0± 46.87 c	1159.31 ±46.87c	1570.76 ±128.52
M_2 (0.05%)	685.15± 3.35	954.25 ±8.25 a	1245.02±13.22a	1545.91 ± 65.77
M_3 (0.10%)	686.88±3.00	931.38 ±6.38 ab	1206.44 ± 5.19 b	1607.95 ±39.03
M_4(0.15%)	686.44± 2.06	937.69±12.19b	1210.44±43.56 b	1572.52±48.70
P_1M_1	689.63±8.30	954.13±15.67a	1206.18±32.52	1699.28±24.05a
P_1M_2	688.50 ±8.17	962.50±14.44a	1258.24±28.89	1611.67±37.91b
P_1M_3	689.88 ±8.28	937.75±1235a	1201.24 ±128.72	1617.24±28.72b
P_1M_4	688.50±8.40	949.88±14.79a	1254.0±22.67	1621.22±31.62b
P_2M_1	683.63 ±7.78	861.88±15.11b	1112.44±20.15	1442.24±29.87e
P_2M_2	681.80 ±8.62	946.00±13.28a	1231.79 ±20.24	1480.14±26.74d
P_2M_3	683.88±8.20	925.00±11.58a	1211.63±20.44	1598.65±25.67b
P_2M_4	684.38 ± 8.82	925.50±12.97a	1166.88±19.70	1523.82±38.78c

a,b,c,d,e, Means within the same column with different superscripts are significantly different ($P<0.05$).

Table (3). Weight gain feed intakes feed conversion,protien efficiency ratio and feed cost /Kg gain as affected by dietary protein levels and DL – methionine supplementation .

tems	Weight gain(g)		Feed intake(g)		Feed conversion		PER		Feed cost /Kg gain	
	Abs	%	Abs	%	Abs	%	Abs	%	Abs	%
P_1	948.22	100	2645.46	100	2.79	100	1.81	100	276.87	100
P_2	812.93	85.73	2519.05	95.22	3.10	111	1.81	100	290.01	105
M_1	884.13	100	2596.53	100	2.94	100	1.81	100	280.77	100
M_2	860.76	97	2622.77	101	3.05	104	1.68	93	301.62	107
M_3	891.35	101	2395.58	92	.96	91	1.98	109	267.66	95
M_4	886.08	100	2613.94	101	2.95	100	1.80	99	280.62	100
P_1M_1	1009.65	100	2637.76	100	2.61	100	1.93	100	253.69	100
P_1M_2	923.17	91	2761.80	105	2.99	115	1.69	88	291.53	115
P_1M_3	927.36	92	2479.56	94	2.67	102	1.89	98	280.08	110
P_1M_4	932.75	92	2674.22	101	2.90	111	1.74	90	282.32	111
P_2M_1	758.61	75	2556.21	97	3.37	129	1.67	87	316.11	125
P_2M_2	798.34	79	2672.33	101	3.35	128	1.68	87	312.89	123
P_2M_3	844.31	85	2313.71	88	2.71	103	2.08	108	254.07	100
P_2M_4	839.44	83	2524.13	96	3.01	115	1.87	97	279.63	110

Table (4) . Carcass characteristics as affected by dietary protein level and DL-methionine supplementation.

Items	Carcass	Liver	Dressing	Feather	Abdominal fat
P_1	67.06±0.64a	2.97±0.21b	73.27±0.3a	5.84±0.47	1.24±0.15b
P_2	64.68 ±0.94b	3.25 ±0.09a	71.49± 0.86 b	5.29±0.16	1.54±0.34a
M_1	66.21±2.59	3.04±0.38	72.73±1.80	4.79±0.37b	1.99±0.32a
M_2	65.00 ±2.37	3.28±0.28	71.64±2.46	5.83±0.54a	0.83±0.15c
M_3	66.16±0.34	3.02±0.29	72.54±0.59	6.05±0.32a	1.46±0.29b
M_4	66.21±0.16	3.10±0.16	72.70±0.12	5.58±0.62a	1.27±0.14b
P_1M_1	68.71±0.46a	2.66±0.18e	74.53±0.65a	4.42±0.30e	1.67±0.24
P_1M_2	67.36±1.71a	3.56±0.04a	74.11±1.69a	6.37±0.06a	0.98±0.24
P_1M_3	65.81±0.59c	2.73±0.13e	71.84±0.45bc	6.36±0.44a	1.18±0.25
P_1M_4	66.37±0.33bc	2.94±0.02d	72.59±0.40abc	6.20±0.28a	1.13±0.15
P_2M_1	63.53±0.84d	3.43±0.06abc	70.92±0.72cd	5.16±0.15cde	2.31±0.15
P_2M_2	62.63±1.19d	3.00± 0.12d	69.18±0.79d	5.28±0.53bcd	0.68±0.12
P_2M_3	66.50±0.65ab	3.31±0.11bc	73.03±0.56ab	5.73±0.33abc	1.75±0.14
P_2M_4	66.05 ±1.07c	3.26±0.07c	72.82±0.98abc	4.96±0.15de	1.40±0.10

a,b,c,d,e, Means within the same column with different superscripts are significantly different ($P<0.05$).

تأثير مستوى البروتين وإضافة الميثونين على أداء بدارى التسمين خلال مرحلة الناهى

شريف محمد سنبل – إبراهيم عاطف عزازى*
قسم إنتاج الدواجن – كلية الزراعة – جامعة الزقازيق
* معهد بحوث الإنتاج الحيوانى – الدقى – جيزة

استخدم فى هذه التجربة ٣٢٠ كتكوت هابرد عمر ٢١ يوما قسمت إلى ٨ مجاميع تحتوى الأربع مجاميع الأولى على مستوى عالى من البروتين ١٩,٨٢ % بروتين خام أما الأربع مجاميع الأخرى تحتوى على مستوى منخفض من البروتين ١٧,٨ % بروتين خام وتم إضافة ٤ مستويات من الميثونين المخلق صفر % ، ٠,٠٥ % ، ٠,١ % ، ٠,١٥ % ، لكل مستوى من مستويات البروتين المستخدمة واستمرت الدراسة حتى عمر ٤٢ يوما.

وفيما يلى أهم النتائج التى توصلت إليها الدراسة :

* **تأثير مستوى البروتين :**

حققت مجموعه الطيور المغذاة على عليقه بها مستوى عالى من البروتين تحسنا معنويا (٠,٠٥) فى الوزن الحى للجسم وكذلك تحسن الوزن المكتسب ومعامل التحويل الغذائى بينما تساوى كفاءة تحويل البروتين لكلا المستويين من البروتين.

* **تأثير إضافة الميثونين المخلق :**

حققت مجموعة الطيور المغذاة على عليقة مضافا لها ٠,١ % ميثونين مخلق تحسن فى وزن الجسم الحى والوزن المكتسب ومعامل التحويل الغذائى وكفاءة تحويل البروتين.

* **التداخل بين البروتين والمثيونين :**

كانت احسن النتائج لوزن الجسم الحى والوزن المكتسب ومعامل التحويل الغذائى من مجموعه الطيور التى تغذت على علائق بها مستوى البروتين العالى مع عدم إضافة الميثونين المخلق إليها. بينما كانت كفاءة تحويل البروتين قد تحققت لمجموعه الطيور المغذاة على مستوى بروتين منخفض وإضافة ٠,١ % ميثونين مخلق.

تأثرت النسب المئوية للأجزاء المأكولة من الذبيحة والكبد ووزن الريش ودهن البطن بمستويات البروتين وكذلك بإضافة الميثونين المخلق إلى العلائق.