Egyptian J. Nutrition and Feeds (2017), 20 (2) Special Issue: 113-122

EFFECT OF SOME NATURAL FEED ADDITIVES TO SUBSTITUTE ANTIBIOTIC AS GROWTH PROMOTERS ON GROWTH PERFORMANCE, CARCASS CHARACTERISTICSAND ECONOMIC EFFICIENCY OF BROILER CHICKS: 2- BEE-POLLEN

N.M. El-Medany; F. Abd El-Azeem; A.I. El-Faham and M.M. Hamed

Poultry Production Dept., Fac. of Agric., Ain Shams Univ., Egypt.

SUMMARY

A total number of 150 unsexed 1 day old Cobb broiler chicks up to 35 days of age were randomly divided to 5 dietary treatments with 3 replicate cages per treatment and 10 chicks per cage, assigning experimental until to investigate the effect of either Antibiotic as growth promoter (colistinsulphate) or bee-pollen (natural, growth promoter) on performance, carcass characteristics, carcass parts and economical evaluation in broiler chickens. dietary treatments were: Control, basal diet without supplementation.Basal diet supplemented with 100g colistensulphate/ton, $T_1$and T_{2-4}, basal diet supplemented with 500, 1000 and 2000g/ton bee-pollen, respectively. The results indicated that: Supplementation of colistinsulphate (100g/ton, T_1) or bee-pollen (2000g/ton, T_4) recorded significant ($P<0.05$) higher body weight gain (being the same figure 12%, respectively), than the control group. Supplementation of colistinsulphate or bee-pollen recorded insignificant differences in feed intake, feed conversion ratio or calories and protein conversion ratio compared with that fed control diet, but numerically (T_1 and T_4) represented the best feed conversion (being, 1.67 and 1.65, respectively) compared with that fed control diet (1.83). Carcass characteristics % and carcass parts % showed insignificant figures (except, gizzard, heart, giblets, abdominal fat and wing %) when chicks fed different dietary treatments. Supplementation of colistinsulphate (T_1) or bee-pollen (T_{2-4}) recorded significant higher performance index being (98.62 to 105.9) compared with that fed control diet (86.21). Concerning economic evaluation, the best economical efficiency values were demonstrated when broiler fed 100g/ton (colistinsulphate) or 500 g/ton (bee-pollen) and the values were 65.3 and 40.8% more, respectively when compared with that of broiler chicks fed control diet. It could be concluded that supplementation basal diet with bee- pollen improved productive performance and enhanced economic efficiency of Cobb broiler chicks.

Keywords:*bee-pollen; broiler, performance, economic efficiency.*

INTRODUCTION

The prominence of Poultry Production today is primarily due to the short generation interval and relatively quick turn over on investment and high quality protein from poultry products (Adeyemo*et al*., 2010). Until recently, antibiotics had been used to improve feed utilization efficiency in poultry and it has been reported that the addition of antibiotic growth promoters to animal diets increased productivity 72% of the time in 12,153 trails (Rosen, 1996). However, a ban on the use of antibiotics as growth promoters has led to a need for finding yet safe additives for improving production performances without negative effects on animal health and welfare, quality of food of an animal origin, human health and the environment (European Commission, 2003). Bee-pollen seems to be an effective natural alternative to antibiotic growth promoters. Many biological properties, including antimicrobial, anti-inflammatory, anti-mutagenic (Proestos *et al*., 2005 and Śaric *et al*., 2009), an antifungal (Garcia *et al*., 2001, Guo *et al*., 2004a and Carpes *et al*., 2007), an antioxidant (Leja*et al*., 2007), an anti-allergic (Hajkova *et al*., 2013), an antiviral, a hypolipidemic a hypoglycemic and an immunostimulating (Almaraż- Abarca *et al*. 2004, Hajkova*et al*., 2013; Guo *et al*., 2004b and Wang *et al*., 2007), activities of bee-pollen have been reported. Research results (Liu *et al*., 2010) suggest that bee-pollen promotes animal growth, improves animal products quality and security, enhances immunizing function of poultry and protects intestinal tract health. Similar observations were reported by other investigators, Wang *et al*., (2007); Attia *et al*. (2014a), and Soha Farag and El-Rayes (2016) in broiler chicks; Wang *et al*. (2007) and Manal Abou El-Naga (2014) in laying hens; SakineBabaei (2016) in quails and El-Hanoan *et al*. (2007); Shewika (2009), Attia *et al*. (2011b); El-Neney *et al*. (2014) and Zeedan *et al*. (2017) in rabbit. On the other hand, these findings are in contrast with the results obtained by Canogulari *et al*. (2009), who concluded that feeding Japanese quails bee pollen up to 20 g/ton diet did not result in any significant improvement in growth performance and body components of quail. Therefore, pollen cannot be recommended as a growth promoter in quail production.

In addition, there are numerous inconsistent and conflicting findings surrounding the effect of using bee-pollen as substitute for antibiotic growth promoters as a performance enhancer in broiler chicks.

The objective of this study is to assess the effect of bee-pollen supplementation (a natural growth promoting substance) as alternative to colistinsulphate (chemical antibiotic) in broiler diets on growth performance, carcass traits and economic efficiency.

MATERIALS AND METHODS

The present study was conducted at the poultry Nutrition Laboratory, Faculty of Agriculture, Ain Shams University, Egypt.

Experimental design and birds:

A total number of 150 unsexed one-day-old age Cobb chicks were used and randomly allocated to five dietary treatments groups. Each treatment group contained 30 chicks which were divided into 3 replicates of 10 chicks each. Chicks were fed starter diet from 1 to 14 days of age, then fed grower diet from 15 to 28 days and then fed finisher diet from 29 to the end of the trail at 35 days of age.
The experimental groups were as follows:

1- Chicks fed the Basal diets (control).
2- Chicks fed the Basal diets supplemented with colistin (100 g colistinsulphate/ton, T_1).
3- Chicks fed the Basal diets supplemented with bee-pollen (500 g/ton, T_2).
4- Chicks fed the basal diets supplemented with bee-pollen (1000 g/ton, T_3).
5- Chicks fed the basal diets supplemented with bee-pollen (2000 g/ton, T_4).

The diets were formulated based on soybean-corn, to meet NRCrequirements (1994), their composition and calculated analysis are shown in Table (1). Chicks were raised in three-tier batteries equipped with feeding hoppers and drinking nipples. Chicks were subjected to standard management practices and temperature was controlled using separate electric heaters and electric extractor fans. Lighting programs was (23 L + 1 D) and feed an water provided ad-libitum, during the experimental period.

Data collection:

Live body weight (LBW) feed intake and mortality number for each replicate for all treatment during the experimental periods were recorded. Body weight gain, feed conversion ratio, energy and protein.

Conversion ratio and performance index according to North (1981) were calculated during the same periods.

Carcass traits and parts:

At the end of the experimental period (35 days of age), slaughter tests were performed using four chicks selected according to the average (LBW) of each treatment. The percentage in relation to live weight of carcass, liver heart, gizzard, giblets, edible parts and abdominal fat were estimated as carcass characteristics. Carcasses were cut fairly into quarters in order to separate wings, breast, thigh and drumstick which were weighed separately to calculate their percentage in relation to carcass weight.

Economic values:

The economic efficiency of broiler chicks was calculated.The price of experimental diets was calculated according to the price of local market of feed ingredients as well as natural additive (bee-pollen) and antibiotic (colistinsulphate), growth promoters at the time of the experiment.

The statistical analysis:

Statistical analysis was conducted using the General linear Model (GLM) procedure of SAS (2004). Means were compared using Duncan's Multiple Range Test (Duncan, 1955) and level of significance was set at minimum of ($P \leq 0.05$).

The statistical model was:

$$Y_{ij} = M + T_i + e_{ij}$$

Where:

Y_{ij} = observation of the parameter measured, M = overall mean, T_i = effect of treatment (I: 1 to 5) and e_{ij}= random error.

RESULTS AND DISCUSSION

Effect of dietary treatments on productive performance:

The effect of antibiotic (colistinsulphate) and bee-pollen supplemented diets on productive performance of broiler chicks can be shown as follows:

Live body weight (LBW) and body weight gain (BWG):

Data present in Table (2) stated that, live body weight at one day of age for all treatments was nearly similar and ranged between 35.50 and 37.20g. It is worth to note that, there were significant ($P<0.05$) differences in average values of either live body weight or body weight gain between broiler chicks fed basal diet and those having colistinsulphateor bee-pollen in their diets (T_{1-4}) at all experimental periods (1-35 days) of age. At the end of the experimental period, chicks fed T_1 or T_4 diets supported the highest body weight (1753.38 and 1751.60g) or body weight gain (1716.50 and 1716.07g) respectively and the differences were significant compared with those fed control diet. In addition, feeding broiler chicks diets supplemented with 500g / ton or 1000 g /ton bee-pollen (T_{2-3}) showed an increased in LBW and BWG by 6.6 and 8.8% compared with those fed control diet. Besides, the differences between the three treatments were significant. These results are in agreement with those reported by many investigators Wang *et al*. (2007), Han *et al*. (2010), Hascik *et al*. (2012), Attia *et al*. (2014a), Cokun *et al*. (2014) and Soha, Farag and El-Rayes (2016).

They concluded that, bee-pollen, has many of enzyme which support the digestive, increased the intestinal absorptive capacity through the longer and thicker villi which stimulates the digestive and absorptive functions and protein anabolism.

Feed intake and conversion:

The results in Table (2) show the relationship between dietary treatments and feed intake and conversion. The obtained data showed that, there were insignificant differences in feed intake among treatments during the studied period (1-35) days of age and the corresponding figures ranged between (2768.0 and 2859.2g) and broiler chicks fed (T_3) diet gave the lowest figure while, chicks fed (T_1) diet had the highest figures and differences among treatments were insignificant. Feed conversion ratio (FCR) showed the same trend since, the figures of FCR indicated insignificant differences between chicks fed diets supplemented with growth promoters (T_{1-4}) compared with those fed control diet during whole experimental period. The best FCR was detected for the chicks fed diets incorporated with 2000 g/ton, T_4 (1.65) or 1000 g/ton bee-pollen, T_3 (1.66). On the other hand, the worst FCR were found in chicks fed control diet (1.83), which could be due to the lowest BWG and the differences between treatments failed to be insignificant (Table 2). The current results are in agreement with those reported by Attia *et al*. (2014a) and Abou El-Naga (2014). Contrary to that, Soha Farag and El-Rayes (2016) concluded that, feed consumption was decreased significantly ($P<0.01$) and feed conversion was improved in broiler chicks received bee-pollen diets compared with the control group during the all experimental periods.

Mortality rate:

The mortality rate (5/150; 3.33%) of broiler chicks fed different dietary treatments during the whole experimental period, without any clear differences among treatments. Hence, it seems that neither kind of growth promoters (Colistin or bee-pollen) nor inclusion of bee-pollen adversely influenced mortality rate.

Calories (CCR), protein conversion ratio (PCR) and performance index (PI):

The effect of different dietary treatments on CCR, PCR and PI in broiler chicks was shown on Table (3). CCR values ranged between 5.14 and 5.71 and broiler chicks fed diets supplemented with 2000g/ton bee-pollen (T_4) gave the lowest figure while, chicks fed control diet had the highest figure and differences among treatments were insignificant. In the same order PCR figures showed the same trend, in which chicks fed control diet had the highest figures (0.36) compared with other treatments and in most cases different between treatments were insignificant.

The figures of PI indicated significant differences between chicks fed (T_{1-4}) diets compared with those fed control diet. The lowest PI was detected for the chicks fed control diet (86.21). On the other hand, the highest PI were found in chicks fed (T_{1-4}) diets and corresponding values were 104.14, 98.62, 102.7 and 105.9 respectively with significant differences between treatments.

Generally, the results showed that the use of 2000g bee-pollen/ton increased PI and improved CCR and PCR. These results are in agreement with the findings of Han *et al*. (2010), Coskun *et al*. (2014) and Soha Farag and El-Rayes (2016).

Carcass characteristics and carcass parts%:

The results in Tables (4 and 5) show the relationship between dietary treatments and carcass characteristics and carcass parts. The percentages of liver, gizzard, heart and giblets in relation to live body weight for chicks fed T_1 diet reflected the lowest significant differences than other dietary treatments.

In the same order, the corresponding values for carcass% ranged between 66.43 and72.09%, while ready to cook (hot carcass + giblets weight) percentages ranged between 71.18 and 76.33%, with insignificant differences between treatments.

Moreover, the relative weight of abdominal fat decreased significantly ($P<0.05$) in groups fed bee-pollen diets compared to control group and the corresponding values were 0.84, 1.06 and 0.67% versus 1.74%, respectively, however, differences were significant.

Effect of different dietary treatments on relative weights of carcass parts of broiler chicks are presented in Table (5). Most of studied traits (i.e. Breast, thigh and drumstick%) were not significantly affected by the treatments. The corresponding values ranged between (43.80 and 47.70) for breast%; while ranged between (27.20 and 29.84) for thigh and ranged between (14.47 and 15.36) for drumstick%, however, the differences were insignificant.

These results are agreed with Hascik et al. (2012) who found that the weights of carcass were insignificant increased in the male chicks fed bee-pollen compared with the control group. On the other hand, these findings are in contrast with the results obtained by Soha Farag and El-Rayes (2016), who showed that inclusion of bee-pollen in broiler diets reflected a significant increased in carcass weight and heart%, while the highest values (%) of relative weight of gizzard and liver were obtained from chicks fed on the basal diet.

Economical efficiency:

Data for economical efficiency of feeding cost of broiler chicks as affected by dietary treatments form 1 to 35 days of age are shown in Table (6). Calculations of economical efficiency were carried out according to the prices of feed ingredients, growth promoters and live body weight prevailing during March 2017 (Time of experiment) as lasted in Table (6). Economical efficiency (EE) values of broiler chicks fed diets supplemented with different growth promoters (T_{1-4}) compared with those fed the control diet from 1-35 days of age were 51.41, 43.79, 43.79 and 39.58 versus 31.10, respectively. Relative economic efficiency values were improved by 65.3, 40.8, 40.2 and 27.3% for the groups fed diets supplemented with 100g colestinsulphate or 500, 1000 and 2000 g bee-pollen/ton respectively as compared to the control group. Therefore, increasing bee-pollen levels in the diet seems to improve total return (LE) and reduced economic efficiency and relative economic efficiency. The highest economic efficiency was detected for the broiler chicks fed diets supplemented with colestinsulphate (T_1) or 500 (T_2), 1000 (T_3) g bee-pollen/ton. These are similar to that obtained by Angelovicova *et al*. (2010) and Manal Abo El-Naga (2014) who reported that average economicalefficiency scores increase only when bee-pollen used by low levels but it decreased with increasing the amount of bee-pollen supplementation of feed mixture.

CONCLUSION

Bee-pollen could be used as growth promoters in the boiler chicks diets up to 1000 g/ton for enhancing growth performance, carcass traits, carcass parts as well as economical efficiency without negative effects on chicks viability.

REFERENCES

Abou El-Naga, M.K. (2014). Effect of bee pollen supplementation on productive and reproductive performance of Norfa chicken. Egypt. Poult. Sci., 34: 119-132.

Adeyemo G.O.;A.D. Ologhobo and O.A. Adebiyi (2010). The effect of graded levels of dietary methionine on the haematology and serum biochemistry of broilers. Int. J. Poult. Sci. 9:158-161

Almaraz-Abarca, Campos M.G.;J.A. Basto Avila-Reyes;N. Naranjo Jimenez;J. Herrera-Corral andL.S. Gonzalez-Valdez (2004). Variability of antioxidant activity among honeybee-collected pollen of different botanical origin Interciencia, 29: 574-578.

Angelovicova M.;D. Stofan;K. Mocar and D. Liptaiova (2010). Biological Se effects of oilseed rape bee pollen and broiler's chickens performance. International conference on food innovation foodinnova, Universidadpolitechnica de Valencia, Spain, pp246-247.

Attia Y.A., A.E. Abd Al-Hamid;M.S. Ibrahim;M.A. Al-Harthi;F. Bovera and Elnaggar, A. Sh. (2014a). Productive performance, biochemical and hematological traits of broiler chickens supplemented with propo bee pollen, and oligosaccharides continuously or intermittently. Livestock Sci., 164: 87-95 .

Attia, Y.A.;A. Al-Hanoun; A. El-Din;E. Bell; F. Bovera and Y.E. Shewika (2011b). Effect of bee pollen levels on productive, reproductive and blood traits of NZW rabbits. J. Anim. Physiol. and Anim. Nut., v. 95: 294-303.

Canogullari, S., M. Baylan;N. Sahinler and A. Sahim (2009). Effects of propolis and pollen supplementations on growth performance and body components of Japanese quails. Arch. Geflugelk 73: 173-178.

Carpes S.T.;R. Begnini;S.M. De alencar andM.L. Masson (2007). Study of preparations of bee pollen extracts antioxidant and antibacterial activity. CienciaeAgrotecnologia 31:1818-1825.

Cokun, I.; H. Cayan; O. Yilmaz; A. Taskin; E. Tahtabicen and H.E. Samli (2014). Effects of in ovo pollen extract injectionto fertile broiler eggs on hatchability and subsequence chick weight. Turk. J. Agric. Nat. Sci. 1: 485-489.

Duncan, D.B. (1955). Multiple ranges and multiple F test. Biometrics, 11: 1-42.

El-Hanoun, A.M.; H. Hedia; M.S. El-Sbeiy and K.I. Kamel (2007). Effect of bee pollen supplementation on some productive, reproductive and biochemical traits of growing male rabbits during winter and summer seasons. 5th Int. Conf. on Rabbit production in Hot Seasons, Hurghada, Egypt, 4-7 December, 417-433.

El-Neney, Battaa, A.M. and K.H. El-Kholy (2014). Effect of natural additive (bee pollen) on immunity and productive performance, digestive and immune responses in growing rabbits. Egypt. Poult. Sci. 34: 579-606.

European Commission (2003). Regulation of the European parliament and of the council of 22 September 2003 on additives for use in animal nutrition. Off. J. of European Union L. 268-29-43.

Garcia M. Pérez arquillue Juan T. Juan MI, Herrera A (2001). A note pollen analysis and antibacterial activity of Spanish honeys. Food SO in orted Sci. Technol. Int. Camb. 7:55-158.

Guo, F.C.; B.A. Williams; R.P. Kwekkel; H.S. Li and X.P. Li (2004a). Effects of mushroom and herb polysaccharides as alternatives for antibiotic on the cecal microbial ecosystem in broiler chickens. Poult. Sci., 83: 175-182.

Guo, F.C.; R.P. Kwakkel; B.A. Williams; H.K. Parmentier; W.K. Li; Z.Q. Yang and M.W. Verstegen (2004b). Effects of mushroom and herb polysaccharides on cellular and humoral immune responsesofEmeriatenella infected chickens. Poult. Sci. 83: 1124-1132.

Hajkova, Z.;R. Toman; S. Hluchy; M., Omellka, R. and I. Bobonovai (2013). The effect of pollen on the structure of the small intestine in rats after an experimental addition in diet. Anim. Sci. and Bio., 46 (1): 232-237.

Han, Y.J.; J.C. Nunes and D. Xavier (2010). Signaling status with luxury goods: The role of brand prominence. J. Market, 74: 15-30.

Hascik, P.; I.O.E. Elimam and J. Garlik (2012). The effect of addition bee pollen to feed mixtures on internal fat of broiler Ross. 308. J. Microbial. Bio. Food Sci. 2: 246-252.

Leja, M.A.; G. Klepacz-baniak J. Czekonska K. (2007). Antioxidative properties of bee pollen in selected plant tive species. Food Chem. 100:237-240.

Liu, G.; W. Yan and Z. Zeng (2010). astern Application of bee pollen in Gallus feed. J. of Bee. 3:22-29.

Manal K. Abou El-Naga (2014). Effect of bee pollen supplementation on productive and reproductive performance of Norfa chicken. Egypt. Poult. Sci. 34: 119-132.

North, M.O. and D.D. Bell (1981). Breeder Management. In: “Commercial Chicken Production Manual”. 4th Ed., Van Nostrand Reinhold. New York, USA.

NRC (1994). National Research Council. Nutrient Requirements of poultry. 9th Ed. Composition of poultry feedstuffs. National Academy Press, Washington, DC, USA. P.P. 61-75.

Proestos C.; N. Chorianopoulos; G.J.E. Nichas andM. Komaitis (2005). RP PLC analysis of the phenolic compounds of plant extracts: investigation of their antioxidant capacity and antimicrobial activity. J Agric. Food Chem. 53:1190-1195.

Rosen, G.D. (1996). The nutritional effects of tetracyclines in broiler feeds. In: Proceeding of worlds poultry Congress New Delhi, India, 2: 141-148.

Sakine, B.; R. Shaeban; A.K.T. Mohammad; T. Golamhosein and N.K.M. Seyed (2016). Veter. Res. Forum 7: 13-20.

SaricBalog T.;S. Sobocanec;V. KusicSverko;D. Rusakubalo;B. Pinto;D. Realiand T. Marott (2009). Antioxidant effects of flavonoid from Croatian Cystusincanus L. rich bee pollen. Chem, Toxicol. 47:547-554

SAS (2004). SAS procedure guide version 6. 12th Ed. SAS institute Inc., Cary, NC, and U.C.A.

Shewika, Y. (2009). Influence of different levels of bee pollen on productive 55. and reproductive performance of New Zealand white rabbits. M.Sc. Faculty of Agric. (Damanhour- Branch), Alexandria University.

Soha A. Farag and T.K. El-Rayes (2016). Effect of bee-pollen supplementation on performance, carcass traits and blood parameters of broiler chickens. 11: 168-177.

Wang J.;S. Li;Q. Wang;B. Xin and H. Wang (2007). Trophic effect of bee pollen on small intestine in broiler chickens. J. Med. Food. 10:276- 280.

Zeedan K.H.; I.I.Battaa; A.M. El-Neney; A.A.A.A. Abuoghaba and K.H. El-Kholy (2017). Effect of bee pollen at difefferentlevels as natural additive on immunity and productive performance in rabbits males. Egypt Poult. Sci. 37: 213-231.

Table (1): Composition and calculated analysis of the starter, grower and finisher experimental basal diets.

Ingredients %	Starter* (0-14 days)	Grower (15-28 days)	Finisher (29-35 days)
Yellow Corn	57.72	61.50	64.01
soybean meal (44%)	30.00	28.00	25.25
Corn Gluten meal (60%)	6.30	4.00	4.00
soybean Oil	1.80	2.60	3.20
Mono calcium phosphate	1.60	1.50	1.35
Limestone	1.45	1.35	1.25
L-lysine HCL	0.30	0.24	0.17
D-l Methionine	0.23	0.21	0.17
Salt (Nacl)	0.30	0.30	0.30
Vit. & min. premix*	0.30	0.30	0.30
Total	100.00	100.00	100.00
Calculated chemical analysis**			
Crude protein %	22.01	20.03	19.03
ME (Kcal/kg)	3015	3090	3172
Calcium %	0.91	0.85	0.78
Available phosphorus %	0.45	0.43	0.39
Lysine %	1.33	1.19	1.06
Methionine%	0.61	0.55	0.50
Methionine + cysteine %	0.98	0.89	0.83
Cost / 1 ton (L.E)	5825	5650	5603

Each 3Kg of premix containing: 15000000 I.U.Vit, A, 3000000 I.U VIT. D 50g. VIT E, 3000mg VIT. K3. 3000 mg VIT. B1, 8000 mg. VIT B2, 4000 mg. VIT B6, 20mg. vit. B12, 15000 mg pantothenic acid, 60000 mg. niacin, 1500 mg. folic acid, 200mg. biotin, 200000 mg VIT C, 700 gm. choline chloride, 80 gm. Mn, 80 gm. zinc, 60 gm. iron, 10 gm. CU, 1 gm. Iodine, and 0.2 gm selenium, where $CaCo_3$ was taken as a carrier up to 3kg, the inclusion rate was 3Kg premix/ton feed Calculated analysis of the experimental diets were done according to (NRC, 1994). Starter, grower and finisher diet (control) are the same as treatments (T1-4) diet but supplemented with 100g\ton colistin sulfate (T1) , 500g/ton pee pollen (T2), 1000g/ton pee pollen(T3) and 2000g\ton pee pollen (T4). The cost / 1 ton (treatments 1-4) were 5860,6075,6325 and 6825 L.E (starter), 5685,5900,6150 and 6650 L.E and (grower), 5638,5853,6103 and 6603 L.E and (finisher)*

Table (2): Effect of dietary treatment on growth performance of broiler chicks (1-35) days of age

Items	Treatments					SE	Significant of differences
	Control	T1	T2	T3	T4		
Body weight (g)							
Initial, 1day	37.20	36.80	35.70	35.80	35.50	0.32	NS
14 days	344.80^{b}	377.45^{a}	337.13^{b}	373.73^{a}	391.23^{a}	9.49	*
28 days	1143.50^{b}	1159.33^{b}	1219.43^{a}	1256.30^{a}	1255.00^{a}	13.11	*
35 days	1569.08^{c}	1753.38^{a}	1669.00^{b}	1704.00^{ab}	1751.60^{a}	20.89	*
			1-14 days				
Body weight gain (g)	308.77^{c}	340.25^{a}	301.40^{c}	337.93^{b}	355.73^{a}	9.49	*
Feed intake (g)	389.00	408.40	389.20	398.00	412.60	13.91	NS
Feed conversion ratio (g feed/g gain)	1.26^{ab}	1.20^{bc}	1.29^{a}	1.18^{c}	1.16^{c}	0.02	*
			15-28 days				
Body weight gain (g)	798.70^{b}	781.88^{b}	882.30^{a}	882.56^{a}	863.77^{a}	19.55	*
Feed intake (g)	1278.00	1190.80	1278.00	1322.00	1303.00	40.92	NS
Feed conversion ratio (g feed/g gain)	1.60	1.52	1.45	1.50	1.51	0.06	NS
			29-35 days				
Body weight gain (g)	425.58^{c}	594.05^{a}	449.57^{c}	447.4^{c}	496.60^{b}	12.58	*
Feed intake (g)	1144.00	1260.00	1100.83	1047.83	1120.87	45.54	NS
Feed conversion ratio (g feed/g gain)	2.69	2.12	2.44	2.33	2.25	0.13	NS
			1-35 days				
Body weight gain (g)	1531.85^{c}	1716.58^{a}	1633.31^{b}	1668.18^{b}	1716.07^{a}	20.58	*
Feed intake (g)	2811.40	2859.20	2768.40	2768.00	2836.70	44.89	NS
Feed conversion ratio (g feed/g gain)	1.83	1.68	1.69	1.66	1.65	0.05	NS
Mortality rate	1/30	3/30	0/30	0/30	1/30		

a,b,c means in the same raw with different superscripts in the same raw are significantly (p< 0.05) different.
N.S. :non-significant.

Table (3): Effect of different dietary treatments on calories conversion ratio, protein conversion ratio and performance index.

Items	Treatments					SE	Significant of differences
	Control	T1	T2	T3	T4		
Calories conversion ratio (CCR)	5.71	5.25	5.27	5.16	5.14	0.17	NS
protein conversion ratio (PCR)	0.36	0.34	0.33	0.33	0.34	0.01	NS
performance index (PI)	86.21^{b}	104.14^{a}	98.62^{a}	102.7^{a}	105.9^{a}	2.58	*

a,b,c means in the same raw with different superscripts in the same raw are significantly (p<0.05) different.
N.S. :non-significant.
North (1981).

Table (4): Effect of dietary treatment on carcass characteristics percentages at 35 days of age

Items	Treatments					SE	Significant of differences
	Control	T1	T2	T3	T4		
Carcass	72.09	68.63	71.59	69.54	66.43	1.53	NS
Neck	5.47^{a}	5.47^{a}	4.90^{ab}	4.90^{ab}	4.10^{b}	0.18	*
liver	2.18	1.60	1.9	2.02	1.89	0.20	NS
Gizzard	1.55^{b}	1.33^{b}	2.21^{a}	2.62^{a}	2.46^{a}	0.03	*
Heart	0.51^{b}	0.47^{b}	0.54^{ab}	0.61^{a}	0.51^{b}	0.15	*
Giblets part	4.58^{a}	3.43^{b}	4.74^{a}	5.24^{a}	4.64^{a}	0.32	*
Total edible part	74.30	72.06	76.33	74.68	71.18	1.62	NS
Abdominal fat	1.74^{a}	1.15^{ab}	0.84^{b}	1.06^{b}	0.67^{b}	0.07	*

a,b,c means in the same raw with different superscripts in the same raw are significantly (p< 0.05) different. N.S. :non-significant.

Table (5): Effect of dietary treatment on carcass parts %

Items	Treatments					SE	Significant of differences
	Control	T1	T2	T3	T4		
Breast	45.33	43.80	45.57	46.25	47.70	1.93	NS
Thigh	27.20	29.84	27.91	27.79	27.84	1.05	NS
Drumstick	15.15	14.82	15.16	15.36	14.47	0.81	NS
Wing	11.95^{a}	11.53^{ab}	11.35^{ab}	10.59^{ab}	9.78^{b}	0.57	*

a,b,c means in the same raw with different superscripts in the same raw are significantly (p< 0.05) different.
N.S. :non-significant.

Table (6): Effect of different dietary treatments on economic evaluation

Items	Treatments				
	Control	T_1	T_2	T_3	T_4
Average feed intake (kg)	2.811	2859	2768	2768	2836
Feed cost/chicken (LE)	15.90	16.26	16.34	17.04	18.87
Total cost/chicken (LE)*	30.90	31.26	31.34	32.04	33.87
Live body weight (kg)	1.569	1.753	1.669	1.704	1.751
Total return (LE)**	42.363	47.331	45.063	46.008	47.277
Net return (LE)	11.463	16.071	13.723	13.968	13.407
Economic efficiency (EE)	37.10	51.41	43.79	43.60	39.58
Relative economic efficiency(REE)	100	165.3	140.8	140.2	127.3

* Total cost = cost of feeding + fixed cost (price of on day live chick, labor, medication… etc).
** According to the local price of kg LBW which was 27.0 L.E.

تأثير استخدام بعض منشطات النمو الطبيعية كبديل للمضادات الحيوية على الأداء الإنتاجى وصفات الذبيحة والعائد الاقتصادى لبدارى التسمين: 2- حبوب اللقاح

نبيل محمد المدنى ، فتحى عبد العظيم، أحمد إبراهيم الفحام ومحمد مصطفى حامد

قسم إنتاج الدواجن – كلية الزراعة – جامعة عين شمس – مصر

استخدم 150 كتكوت تسمين غير مجنس عمر يوم من سلالة الكب لمدة 35 يوم حيث وزعت عشوائياً على 5 معاملات غذائية كل معاملة احتوت على 3 مكررات وكل مكرر بها 10 كتاكيت.

وذلك لدراسة تأثير إضافة (مضاد حيوى) كولستين سلفات أو حبوب اللقاح (بديل طبيعى) كمنشطات نمو على الأداء الإنتاجى وصفات الذبيحة والقطعيات للذبيحة والعائد الاقتصادى لبدارى التسمين.

وكانت المعاملات الغذائية كالآتى:

كنترول: عليقة قاعدية بدون إضافة.

T_1: عليقة قاعدية مضاف إليها 100 جم كولستين سلفات/طن.

T_2: عليقة قاعدية مضاف إليها 500 جم حبوب لقاح/طن.

T_3: عليقة قاعدية مضاف إليها 1000 جم حبوب لقاح/طن.

T_4: عليقة قاعدية مضاف إليها 2000 جم حبوب لقاح/طن.

أوضحت النتائج المتحصل عليها أن:

1- إضافة 100جم كولستين سلفات/طن (T_1) أو حبوب اللقاح 2000جم/طن (T_4) يعطى أعلى وزن جسم مكتسب معنوياً (أعلى بـ 12%) بالمقارنة بمجموعة الكنترول

2- إضافة الكولستين سلفات أو حبوب اللقاح لم يؤثر معنوياً على استهلاك العلف، معامل تحويل الطاقة أو البروتين بالمقارنة بمجموعة الكنترول ولكن رقمياً سجلت المعاملتين (T_4, T_1) أفضل معامل تحويل غذائى (1.67 و 1.65 على التوالى) بالمقارنة بمجموعة الكنترول (1.83).

3- قيم صفات الذبيحة والقطعيات لم تتأثر بالمعاملات الغذائية فيما عدا (القانصة، القلب، الحوائج، دهن البطن والجناح%).

4- إضافة الكولستين سلفات (T_1) أو حبوب اللقاح (T_{2-4}) سجل أعلى قيم معنوياً لدليل الأداء الإنتاجى (98.62 إلى 105.9) مقارنة بمجموعة كنترول (86.21).

5- الكفاءة الاقتصادية أظهرت أن معاملة الكولستين سلفات (T_1) 100جم/طن أو حبوب اللقاح (T_2) 500جم/طن أعطت أفضل عائد اقتصادى حيث تفوقت على مجموعة الكنترول بمعدل 65.3 و40.8% على التوالى.

الخلاصة: إضافة حبوب اللقاح إلى العلائق القاعدية لبدارى التسمين (سلالة الكب) أدى إلى تحسن الأداء الإنتاجى والكفاءة الاقتصادية بدون التأثير على صفات الذبيحة والقطعيات.