Egyptian Poultry Science Journal

http://www.epsaegypt.com

ISSN: 1110-5623 (Print) – 2090-0570 (On line)

EFFECT OF USING SOME NATURAL FEED ADDITIVES TO SUBSTITUTE ANTIBIOTIC GROWTH PROMOTERS ON PERFORMANCE AND BLOOD PARAMETERS OF BROILERS

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Received: 29/06/2014 Accepted: 20/08/2014

ABSTRACT: This investigation aimed to evaluate the biostrong, probiotic or pungent substance as natural feed additives instead of antibiotics (zinc bacteriacin) on growth performance, carcass characteristics, bone measurements, some blood metabolites and economic efficiency of broiler chicks. One hundred and fifty unsexed one day old age Hubbard chicks were weighed and randomly allocated for four dietary treatment groups.

The 1st group was fed the basal diets without supplementation (control), while the 2nd, (T_1) the 3rd (T_2), the 4th (T_3), and 5th (T_4) groups were fed the basal diets supplemented with biostrong, probiotic, pungent substance and zinc bacteriacin at the level of 150g, 1000g, 500g and 500g/ton, respectively. Diets and water were provided ad lib. throughout the experimental period (1-32 days of age).

The results indicated that:-

1- Body weight gain, feed intake and feed conversion for the broiler chicks fed basal diets supplemented with pungent substance (T_3) were significantly differences than those fed control diets at 18 days of age. However at 32 days of age there were insignificant differences among treatments in body weight gain, but numerically pungent treatment (T_3) represented the highest body weight gain and significant lowest feed intake and significant improved feed conversion.

2- Total edible parts were significantly higher for the treatments received probiotic (T_2) or pungent substance (T_3) than those fed on control diets.

3- Bone measurements (wet tibia weight, Tibia length, Tibia width and tibia seedor Index) showed that insignificant figures when broiler chicks fed different dietary treatments.

4- Blood parameters showed insignificant figures in most parameters. However uric acid and ALP activity have significant difference ($P \leq 0.05$) for dietary treatments.

Key Words: Biostrong-Pungent – Tibia – antibiotics – uric acid.

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5- Economic evaluation, the best economical efficiency value was demonstrated when broiler chicks fed 500 g/ton pungent substance and the value was (34%) more when compared wit that of broiler chicks fed control diets.

In conclusion: Supplementation basal broiler diets with pungent substance improved productive performances of Hubbard broiler chicks and decreased uric acid. The best economical and relative economical efficiency were recorded for the broilers fed basal diet supplemented with pungent substance at the levels of 500g/ton diet.

INTRODUCTION

Poultry rations are formulated to contain an optimum nutrient concentration obtainable at reasonable cost for desirable growth, production and efficiency of feed utilization, so certain non nutritive feed additives are sometimes used.

Alternative additives such as herbs, spices essential oils extracted from aromatic plants, enzymes, organic acids and probiotics were used as growth promoters in poultry diets in many countries for organic poultry production [Griggs and Jacob, 2005].

Numerous studies demonstrated that a great number of medical and aromatic herbs, as well as fruits and leaves of some berry plants biosynthesize phytochemicals possessing antioxidant activity and may be used as a natural source of free radical scavenging compunds [Sacchetti et al., 2005 and Yu et al., 2005].

According to definition by FAO/WHO (2001), probiotics are "live microorganism which when administered in adequate amounts confer a health benefit on the host". More precisely probiotics are live microorganisms of nonpathogenic and nontoxic in nature, which when administered through the digestive route, are favorable to the host's health.

Probiotics are natural feed supplements and their function is based upon primary fermentation and supporting the growth of intestinal microflora. Maximum microflora growth expands the digestive capacity as evidenced by increase of volitate fatty acids production and dry matter digestibility [Seleem, et al; 2001].

Abd El-Hakim et al (2009) have been used some plants as natural antioxidants in broiler diet to decrease the damage of protein by free radical and decrease the lost of protein in feces. They obtained significantly increasing in nitrogen retention by 13.25% compared to control diet and indicated that natural antioxidants many decrease the damage of protein by free radical. Also, immune cost consumes a lot of protein.

Antibiotic feed additives have long been used as growth promoters in poultry nutrition.

Aban on the use of antibiotic as growth promotrs has led to a need for finding yet safe additives for improving production performance without negative effects on animal health and welfare, quality of food of an animal origin, human health and the environment (European commission, 2003)

The antibiotics used as feed additives (zinc bacteriacin) for hope of growth stimulation affect the gut microflora, which results in the reduction of the resistance to infection caused by certain bacteria [Areneo et al, 1996].

Today's intensive animal agriculture industry must adapt to producing animal in a world without antibiotic growth promoters in response to consumer demands. Also, assure that all products of livestock and poultry are Hazard Analysis and Critical Control Point [HACCP] certified. So, there is a tendency to use herbs and probiotics as natural feed

additives to avoid the residual cumulative effect for either antibiotics or sysnthetic drugs in final products of poultry, which has a negative effect on the human health [Ragab M.S. 2012].

Biostrong is a plant derived [phytogenic] feed additive for poultry. It is comprised of high quality, proven active ingredients that improve digestion, enhance metabolic function, and increase nutrient retention. So, biostrong optimizes performance, production and profitability. The active ingredients of biostrong are essential oils, bitter substances, pungent subtances and saponins derived from herbs, spices and their extracts.

Therefore, this study was conducted to examine the natural additives substitution (biostrong, probiotic, or pungent substance) instead of antihiotics (zinc bacteriacin) and their effects on growth performance, carcass characteristics bone measurements, and some blood metabolites of broiler chicks.

MATERIALS AND METHODS

This study was carried out at poultry experimental unit, Agricultural Experiment and Research station at shalkan, Faculty of Agriculture, Ain shams university, Egypt.

In order to evaluate the comparative study between antibiotics, and natural additives from some points as their effects on immunity, antioxidant activity, free radical scavenging compound and their functions as growth promoter.

A total number of 150 unsexed one-day-old age Hubbard chicks. They were fed on 22.39% CP and 3030 kcal ME/Kg diet for all chicks for starter (0-18 days), then fed on grower (20.93 CP and 3029 kcal ME /Kg)from (19-32 days) of age.

The chicks were randomly distributed into four treatment groups and control as followed, biostrong (150 gm/ton) (T_1), probiotic Lactobac (1000 gm/ton) (T_2), pungent substances 500 g/ton (ginger 166gm/ton, black pepper 167 gm/ton, and red pepper 167 gm/ton) (T_3), and zinc bacitracin (500 gm/ton) (T_4). Feed and water were offered ad libitum during experimental period. Each treatment was represented in 3 replicates of 10 chicks each. The experiment lasted at 32 days of age. Average initial weight of chicks at the experimental start ranged between 44.5 and 47.5 g with insignificant differences among the experimental groups. Body weight gain, feed intake, and feed conversion were recorded weekly and presented herein (0-18) and (19-32) of age. All diets were formulated to provide the nutrient requirements according to guideline of NRC (1994). Composition of the experimental diet is shown in Table (1). At the end of experiment, (32 day old), three birds were randomly taken from each treatment group and slaughtered. The percentage of carcass, liver, heart, gizzard, giblets, edible parts and abdominal fat were estimated as carcass characteristics. Tibia dimension as tibia weight, tibia length and tibia width were evaluated, then tibia seedor index (SI) were recorded by Seedor et al, (1991) equation.

SI = Tibia dry wt. (g)/tibia length (cm)

Individual blood samples were collected in dry clean centrifuge tubes from the salughtered birds and plasma was separated by centrifugation at 3000 rpm for 15 min. and assigned for subsequent determination.

Plasma samples were stored at-20°C in a deep freezer until the time of chemical determination. Biochemical analysis of blood plasma were conducted in poultry physiology laboratory, Faculty of Agriculture, Ain Shams University.

Quantitative determination of blood was included the following: total protein [according to Gornal et al., 1949], albumin [method as decribed by Doumas, 1971], globulin [determined by subtraction the value of alb. for the sample from its corresponding value for total protein] total lipids [using colorimetric method described

by Zollner and Kirsch, 1962], total cholesterol [enzymatic colorimetric method described by Richmond, 1973), triglycerides [method described by Fassati and Prencipe, 1982), AST and ALT [both were determined using a method described by Reitman and Frankel, 1957] and uric acid as commercial kit.

All biochemical parameters of blood were colorimetrically determined using commercial diagnosing kits [produced by Bio-Diagnostics company, Egypt.

The economic efficiency of broiler chicks production was also calculated. The price of experimental diet was calculated according to the price at local market as the price of the ingredients and chicks at the time of the experiment.

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) where the level of significance was set at minimum ($P \leq 0.05$).
The statistical model was:

$$Y_{ij} = \mu + T_i + eij$$

Where:
Yij = An observation
μ = overall mean
T_i = effect of treatment
Eij = random error

RESULTS AND DISCUSSION

Effect of different treatments on productive performance:

From Table (2), we have been noted that the different treatments of growing chicks could be detected from the followings:

Body weight and body weight gain:

The obtained data showed that there were significant different in body weight among treatment groups during study especially 18 days of old age. Probiotic and pungent treatments were the highest values [716 and 696g] resp. than other treatments and control. However at 32 old of age there were insignificant differences among treatments, but numerically pungent treatment represented the highest body weight than control and other treatments, also, the rest of treatments were highest values of body weight compared with control group.

At the same trend, body weight gain had improved especially at T_2, T_3 and T_4 compared with T_1 and control groups. These results from one day to 18 day-old of age for growing chicks, but at 19-32 days of age, the results showed the differences between treatments insignificant.

Moreover, the response of body weight gain to different treatments were not significant from 0-32 days old age of growing chicks but T_3 and T_4 gave the best body weight gain compared with other treatments and control group [1794.36 and 1767.10g] resp.

These results could be considered as probiotics have been used as a feed supplement in diet of different classes of poultry to enhance productive performance and immune responses (Higgins et al., 2008). In this regard the dietary supplementation of probiotic benefit the host animal by stimulating appetite [Nahashon et al., 1992], stimulate the immune system [Tom and Powvie, 2001; Koenen et al., 2004], produce the endogenous digestive enzymes [Saarela et al, 2000], decrease pH and release bacteriocins [Rolfe, 2000], So improved body weight and body weight gain.

Also, pungent supplementation and herbs in general have synergetic effect on Gram-positive and negative bacteria [Ali et al, 2008]. Also, Bedford (2000) reported that control the growth and colonization of numerous pathogenic and non pathogenic species of bacteria in chicks gut lead to agreater efficiency in the utilization of feed, resulting in enhanced growth.

Feed intake and Feed conversion:

Data showed in Table (2) indicated that feed intake at 0-18 days decreased significantly (P≤0.05) for birds that fed bio-strong and pungent substances than other treatment groups and control [999 and 862g] resp.

Also, from 19-32 days old age, feed intake decreased significantly for birds that fed on pungent substances (1883 g) and have the lowest feed intake than other treatments and control.

Interestingly, feed intake significantly different among treatments from 0-32 days old age but these differences obviously in birds that fed on pungent substances.

From other side, feed conversion have improvement for birds that fed on probiotic and pungent substances than other treatments and control [1.53 and 1.32] resp. from 0-18 days old age. These trend has changed from 19-32 days old age, even T_1, T_3 and control have showed improvement in feed conversion compared with other treatments [1.69, 1.64 and 1.65] resp, Also, from 0-32 days old age T_3 was continued in improvement of feed conversion than other treatment groups and differences was significant. (Table 2).

From the previous results we noted that herbs and herbal products are incorporated in poultry diet to replace synthetic products in order to stimulate or promote the effective use of feed nutrients which may subsequently result in more rapid body weight gain, higher production rates and improved feed efficiency [Al-Khdri, 2013].

Moreover, active compounds of herbs may improve digestion and stimulate the immune function in broilers [Ghazalah and Ali, 2008]. Supplementation of spices and herbs could have many benefits to broilers health and performance such as having antioxidative potential [Hoffman and Wu, 2010], antimicrobial activity [Dorman and Deans, 2000; Lee et al, 2004; Steiner, 2009], enhancing digestion by stimulating endogenous enzymes [Al-Khdri, 2013].

These results agreement with Rahimi et al, 2011 who indicated that, higher body weight are noted in the broilers fed thyme may be due to the beneficial effects of these herbs in birds nutrition which includes improvement of endogenous digestive enzymes secretion and antibacterial, antiviral, antioxidant and anthelmintic actions, All these actions cause improvement in health, growth and performance of broiler.

Carcass characteristics:

Table (3) have showed the effect of different treatments on the carcass characteristics at the end of experiment [32 days of age].

Experimental treatments had no significant effect in all characteristics except for total edible part especially for T_3 and T_2. These treatments recorded the highest values [78.29 and 76.27] resp. then, T_1 and T_4 (75.88 and 74.89) resp. compared with control group [73.70].

Although abdominal fat parameter had non significant differences among all treatment groups, but T_1, T_2 and T_3 have the lowest values compared with T_4 and control groups [1.46, 1.48, 1.40] resp. compared with [1.83 and 2.28] resp.

From other point, there were decrease in gizzard percentage of birds that fed T_1, T_2 and T_3 compared with T_4 and control groups, but these decreases have not significant.

These results have been indicated that biostrong, probiotic and pungent have improved of carcass characteristics than Zinc bacitracin and control groups.

At the same time, these treatments have lowered /decreased the abodominal fat, and consequently this benefit for human's health similar results were reported by Bahnas et al, (2008 and 2009); and Ragab et al,(2010). Also, Ocak et al (2008) reported that the carcass weight and

dressing % of broiler chicks were not significantly affected by different levels of dry pep.

Internal organ weights and carcass characteristics of broiler chicks fed different levels of dry pep. were not significantly influnenced [Toghyani et al, 2010].

Conversely, Al-Kassie (2010) showed that the chicks fed with 0.56 and 1% dry pep. exhibit a significant increase in dressing % compared with the control group. He also reported that mean weight of heart and gizzard showed no significant difference as our results. Moreover, Hassan et al, (2004) found that addition of medicinal and aromatic plants in broiler diets had significantly higher dressing% than those fed the control diet.

Bone Measurements:

Table (4) showed the effect of different treatments on the bone measurements.

Although all Tibia measurements have not significantly difference, but numerically, tibia length in T_2, T_3, T_4 have recorded the highest values compared with T_1 and control groups.

These results have indicated that it may be probiotics and herbs have improved of Ca metabolism and consequently increased the tibia length by hyperplasia and hypertrophy of osteoclast cells, and these results needs more investigation on the bone by histology examination to reply about these questions.

Blood parameters:

The results concerning on the effect of different treatments on some blood parameters are shown in Table (5).

Although most of blood parameters have not significant different affected by different dietary treatments, uric acid and ALP activity have significant different ($P \leq 0.05$) by these dietary treatments.

Uric acid concentration recorded lowest values for chicks fed biostrong, probiotic and pungent substances than control and zinc bact.

These results indicated that it may be these herbs and probiotic have improvement of kidney function and protein metabolism and consequently increase of nitrogen utilization. The significantly decreased of uric acid compared with control group meaning that excess of nitrogen compounds are utilized by birds and this occur in nitrogen retention percentage and these results inagreement with Abou Sekken et al., (2012).

Also, ALT activity has significantly different among treatment groups and the lowest values were found for chicks fed control biostrong probiotic and zinc bact. than those that fed on pungent, and this may be due to that level of these substances may made some inflammation in liver, but didn't have adverse effect on liver, and that’s clear from the liver appearance during experiment.

Concerning A/G ratio, A/G ratio is an indicator of immunity response and globulin is source of gamma globulins [antibodies]. Although there is not significant different among treatments in A/G ratio values, but T_1, T_2 and T_3 recorded the best ratios than control and T_4 groups, and that's mean, these treatments have improvement effect on immunity of chicks. Many studies found that blood total protein, albumin and globulin concentrations were not affected by probiotic supplementation [Dimcho et al, 2005, Alkhalf et al 2010; and Ashayerizadeh et al., 2009] although, others (Havenaar and Spanhaak, 1994) reported that probiotic is stimulate poultry immune system.

Regarding lipid metabolites, the results indicated that the group of chicks that fed on T_1, T_2 and T_3 have the lowest cholesterol concentrations than those fed on control and Zinc bact.

These results are in general agreement with those reported by Sturkie, [2000] who reported that the concentration

of avian plasma lipids are influenced by the physical and nutritional status of birds.

Results of reducing cholesterol, that produced by T_1, T_2 and T_3 in the current study may be due to synthesis of bile acids from cholesterol in the liver that is considered the most important way of cholesterol excretion.

Besides, some of the microorganisms present in the probiotic preparation could utilize the cholesterol present in the gastrointestinal tract for their own metabolism, thus reducing the amount of cholesterol absorption.

In addition, probiotic microorganisms inhibit Hydroxy methyl – glutaryl Coenzyme A [an enzyme involved in the cholesterol synthesis] (Fayza, et al; 2012), and consequently, blood cholesterol of these chicks have decreased and these benefit for consumers to reduce the occurrence of cardiovascular heart diseases.

About the herbs as we previously mentioned, these herbs have two types of unusual components that provide unique health benefits by decreasing free radical and increasing the antioxidant capacity of the blood and improves the general healthy conditions of poultry that may be reflected in increased immune reponse. [Ragab, 2012]

Economic Evaluation:

Data for economic evaluation are summarized in Table (6). The price figures are based on the recent prices of local market for ingredients and selling price of chickens in Qaliobeya region, Egypt.

Results in Table (6) show that EE values during the period from 1 to 32 days of age. Chicks fed diet contained pungent substance (T_3) had the best economical and relative efficiency values being 31.81 and 134%, respectively (this may be due to total feed cost/chick and good performance) as compared with control group. Whereas, chicks fed diet contained probiotic (T_2) had the lowest corresponding values, being 22.39 and 94%, respectively. The relative efficiency varied between 94% to 134%.

On the other hand chicks fed diets contained Biostrong or zinc bacteriacin had the same economical and relative efficiency values when compared with chicks fed the control diet.

Soliman et al. (2003) found that the inclusion of probiotic or herbal feed additives in growing rabbits, Japanese quail or broiler diets resulted in the least feed cost/Kg gain and the highest percent of economical efficiency as compared with control diet. However, Ibrahim (2005) noted that the economical efficiency % showed descending value for rabbit treatment groups which received some medicinal plants as feed additives.

On the other hand, Elnagar (2012) concluded that responses to either probiotics or enzymes may be affected by many factors including environment, the amount of each and the interaction between them as well as other substances such as bird age and quality of ingredients or another possible reasons.

It could be concluded that using some natural feed additives in broiler diet (500 g/ton) to improve broiler performance without any bad effect on broiler chicks.

Table (1): Composition and calculated chemical analysis of the starter and grower experimental diets

Ingredients %	Starter diet* (0-18 days)	Grower diet* (19-32 days)
Yellow corn	46.45	54.44
Soybean meal (44%)	36.20	30.15
Full fat soya	9.00	9.00
Soya + Sunflower oil	3.65	2.00
Mono calcium phosphate	1.85	1.68
Limestone	1.60	1.48
Salt (Nacl)	0.40	0.40
DL-Methioine	0.34	0.20
L-lysine Hcl	0.08	0.22
Vitamin α Min. Mix**	0.30	0.30
Choline chloride 50%	0.13	0.13
Total	100.00	100.00
Calculated chemical analysis ***		
Crude protein %	23.12	21.13
ME (Kcal/Kg)	3071	3045
Calcium %	1.02	0.93
Available phosphorus %	0.50	0.64
Lysine %	1.39	1.39
Methionine %	0.72	0.55
Methioine +cysteine %	1.06	0.88

** Composition of vitamin and minerals premix. Each 3Kg of premix containing: 15000000 I.U. vit, A, 50 g. vit E, 3000 mg. vit. K_3 3000 mg B1, 8000mg. Vit. B_2 4000mg, vit. B6, 20mg vit. B_{12}, 15000mg. pantothenic acid, 60000 mg. Niacin, 1500 mg. Folic acid, 200mg. Biotin, 200000 mg vitc, 700mg. choline choloride, 80gm Mn, 80g. Zn, 60gm, Iron, 10gm. Cu, 1gm. Cu, 1gm. Iodine and 0.2gm selenium, where Ca Co_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 and grower T1, T2, T3 and T4 diets are the same control diets but supplemented with 150g/ Biostrong, 1000g/probiotic, 500g/pungent substance and 500g /zinc lactercin/Ton diets respectively.

Table (2): Effect of dietary treatments on growth performance of broiler chicks.

Items	Dietary treatments					SE	Significant of differences
	Control	T_1	T_2	T_3	T_4		
Body weight (g)							
Intial, 1 day	45.67	45.33	45.66	44.50	47.50	1.63	NS
18 days	623.00^{c}	642.00^{c}	716.00	696.66^{a}	669.00^{b}	6.90	*
32 days	1787.13	1802.50	1811.86	1838.86	1814.60	11.15	NS
0 18 days							
Body weight gain (g)	577.33^{c}	596.66^{c}	670.33^{a}	652.16^{a}	621.50^{b}	6.84	*
Feed intake (g)	1019.00^{ab}	999.00^{b}	1031.00^{a}	862.00^{c}	1019.00^{ab}	9.06	*
Feed conversion(g feed/g gain)	1.76^{a}	1.67^{a}	1.53^{b}	1.32^{c}	1.64^{a}	0.01	*
19-32 days							
Body weight gain (g)	1164.13^{a}	1160.50^{a}	1095.86^{b}	1142.20^{a}	1145.60^{a}	11.29	NS
Feed intake (g)	1919.67^{ab}	1962.66ab	1985.00a	1883.00b	2002.66a	28.72	*
Feed conversion (g feed/g gain)	1.65^{c}	1.69^{bc}	1.81^{a}	1.64^{c}	1.74^{ab}	0.02	NS
0-32 days							
Body weight gain (g)	1741.47	1757.16	1766.20	1794.36	1767.10	10.87	NS
Feed intake (g)	2938.67^{a}	2961.66^{a}	3016.00^{a}	2745.00^{b}	3021.66^{a}	35.96	*
Feed conversion (g feed/g gain)	1.69a	1.68a	1.70a	1.53b	1.70a	0.01	*

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 feeding different experimental diets on carcass characteristics at 32 days (%).

Items	Dietary treatments					SE	Significant of differences
	Control	T_1	T_2	T_3	T_4		
Live body weight (g)	1741.67	1713.30	1580.00	1700.00	1691.70	42.24	NS
Carcass weight (g)	1211.67	1231.67	1140.00	1263.33	1200.00	20.15	NS
Carcass %	69.6	71.9	72.2	74.3	70.9	0.29	NS
Liver	2.40	2.52	2.41	2.36	2.27	0.20	NS
Gizzard	1.24	1.07	1.13	1.09	0.14	1.28	NS
Heart	0.48	0.39	0.52	0.39	0.39	0.08	NS
Giblets	4.12	3.97	4.07	3.83	3.94	0.31	NS
Total edible part	73.70^{b}	75.88^{ab}	76.27^{ab}	78.29^{a}	74.89^{b}	0.83	*
Abdominal fat	1.83	1.46	1.48	1.40	2.28	0.34	NS

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

Table (4): Effect of feeding different experimental diets on some bone measurements.

Items	Dietary treatments					Significant of differences
	Control	T_1	T_2	T_3	T_4	
Wet tibia weight (g)	9.52±0.32	8.67±1.11	8.84±0.21	8.45±0.65	9.56±0.61	NS
%	0.55±0.02	0.51±0.06	0.51±0.01	0.54±0.02	0.57±0.04	NS
Tibia length (mm)	7.93±0.13	7.83±0.09	8.17±0.12	8.00±0.15	8.23±0.07	NS
Tibia width (mm)	0.57±0.02	0.58±0.06	0.55±0.03	0.53±0.03	0.63±0.03	NS
Tibia seeder Index	0.57±0.02	0.53±0.04	0.50±0.01	0.52±0.04	0.56±0.04	NS

a,b means in the same raw with different superscripts in the same raw are significantly (P<0.05) different.

Table (5): Effect of feeding different experimental diets on some plasma parameters.

Items	Dietary treatments					Significant of differences
	Control	T_1	T_2	T_3	T_4	
Total protein (g/dl)	6.10	6.17	6.82	6.60	6.09	NS
±	±0.11	±3.92	±0.18	±0.45	±0.19	NS
Albumin (g/dl)	4.04	3.92	3.91	3.88	4.02	NS
±	±0.17	±0.04	±0.09	±0.07	±0.03	NS
Globulin (g/dl)	2.06	2.25	2.90	2.72	2.07	NS
±	±0.06	±0.28	±0.22	±0.52	±0.17	
Uric acid (mg/dl)	6.88ab	5.12b	5.73ab	4.00b	8.39a	*
±	±0.21	±0.84	±1.15	±1.53	±0.82	
Total lipids (mg/dl)	365.36	345.19	485.17	395.01	384.34	NS
±	±82.34	±49.35	±134.56	±11.44	±39.68	
Triglycerides (mg/dl)	78.66	76.66	76.33	78.33	52.66	NS
±	±17.70	±4.91	±.1.85	±18.35	±4.70	
Cholesterol (mg/dl)	161.60	155.00	165.33	155.53	178.86	NS
±	±3.14	±10.91	±32.77	±8.42	±9.63	
AST (RFU/ml)	37.80	26.33	30.14	26.57	20.69	NS
±	±4.43	±8.69	±7.68	±4.87	±5.08	
ALT (RFU/ml	27.80b	45.09ab	54.39a	60.22a	44.46ab	*
±	±9.00	±9.40	±4.92	±1.30	±8.48	
A/G ratio	1.96	1.74	1.35	1.43	1.94	N.S.
±	±0.13	±0.04	±0.01	±0.02	±0.13	

a,b 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 feeding different dietary treatments on economic evalution.

Items	Dietary treatments				
	Control	T_1	T_2	T_3	T_4
Live body weight (KG)	1.787	1.803	1.812	1.839	1.815
Price/Kg body weight (LE)	13	13	13	13	13
Total revenue/chick (LE)	23.23	23.44	23.56	23.91	23.60
Total feed intake /chick (Kg)	2.939	2.96	3.016	2.745	3.021
Total feed cost /chick (LE)	10.77	10.94	11.25	10.14	11.11
Fixed cost/chick (LE)	8	8	8	8	8
Total cost /chick (LE)	18.77	18.94	19.25	18.14	19.11
Net revenue (LE)	4.46	4.5	4.31	5.77	4.49
Economic efficiency (EE)	23.76	23.76	22.39	31.81	23.50
Relative (EE)%	100	100	94	134	99

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الملخص العربى

دراسة مقارنة بين المضادات الحيوية وبعض الاضافات الطبيعية فى علائق بدارى التسمين على الأداء الإنتاجى وقياسات الدم

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أجريت هذه الدراسة للتعرف على تأثير إضافة البيوسترونج ، البروبيوتك والمواد الحريفة كأضافات طبيعية بالمقارنة بالمضادات الحيوية (زنك باستيرياسين) على الأداء الإنتاجى وصفات الذبيحة وصفات العظم وبعض قياسات الدم والكفاءة الاقتصادية لبدارى التسمين.

استخدم فى هذه الدراسة عدد (١٥٠) كتكوت عمر يوم لسلالة الهبرد ثم قسمت إلى (٥) معاملات غذائية تحتوى كل معاملة على (٣) مكررات فى كل مكرر (١٠) كتاكيت وتم اختبار المعاملات الغذائية باستخدام علائق نباتية (أذرة صفراء – كسب فول صويا) خلال المراحل المختلفة [بادئ (يوم -١٨ يوم) ونامى (١٩-٣٢ يوم)] وكانت المعاملات كالأتى :

المجموعة الأولى : تم التغذية بدون إضافات (كنترول) ، فى حين المجموعات الأربعة الأخرى تغذت على عليقة الكنترول مضاف إليها البيوسترونج (T_1) ، البروبيوتك (T_2) ، المواد الحريفة (T_3) والزنك باستيرياسين (T_4) بمعدل ١٥٠جم ، ١٠٠٠ جم ، ٥٠٠ جم ، ٥٠٠ جم /طن علف على التوالى.

قدمت العلائق والمياة بشكل حر خلال فترات التجربة .

ولقد خلصت النتائج إلى:

١- سجلت المجموعة التى تغذت على ٥٠٠جم مواد حريفة/طن علف أعلى معدلات نمو وأقل استهلاك علف وأفضل معامل تحويل غذائى بالمقارنة بمجموعة الكنترول وكانت الفروق معنوية عند ١٨ يوم بينما لا يوجد فروق معنوية فى وزن الجسم المكتسب عند ٣٢ يوم من العمر بين المعاملات المختلفة إلا أن معاملة المواد الحريفة اظهرت بدارى التسمين افضل وزن مكتسب (غير معنوى) وأقل استهلاك علف (معنوى) وأفضل معامل تحويل غذائى (معنوى) بالمقارنة بالكنترول.

٢- صفات الذبيحة لم تتأثر ولم تختلف معنوياً بالمعاملات المختلفة إلا أن الأجزاء الكلية المأكولة سجلت معاملة البروبيوتك (T_2) ومعاملة المواد الحريفة (T_3) أعلى القيم معنوياً بالمقارنة بمعاملة الكنترول.

٣- صفات العظام لعظمة الساق (وزن العظمة طازجة – طول العظمة – سمك العظمة مؤشر سيدور) لم تتأثر بالمعاملات المختلفة.

٤- صفات الدم لم تتأثر بالمعاملات المختلفة ألا أن حامض اليوريك أظهر انخفاض غير معنوى و ALT ارتفع معنوياً فى المعاملة المغذاة على المواد الحريفة بالمقارنة بالكنترول.

٥- الكفاءة الاقتصادية اظهرت معاملة المواد الحريفة (T_3) افضل عائد اقتصادى حيث تفوقت على مجموعة الكنترول بمعدل ٣٤%.

الخلاصة : إضافة المواد الحريفة إلى علائق بدارى التسمين أدى إلى تحسن معنوى فى قيم الأداء الإنتاجى لبدارى التسمين وخفض من حامض اليوريك وكذلك حسن معنوياً من النسبة المئوية للأجزاء المأكولة للطيور. ومن جهة أخرى سجلت أفضل كفاءة اقتصادية وكفاءة اقتصادية نسبية لبدارى التسمين للطيور التى تغذت على عليقة قاعدية مضاف إليها المواد الحريفة بمعدل ٥٠٠جم/طن علف. لذا توصى الدراسة باستخدام المواد الحريفة بدون أدنى ضرر على بدارى التسمين.