INCREASING THE ACTIVITY OF ANTIOXIDANT SYSTEM IN BROILER CHICKS DURING SUMMER SEASON 2-EFFECT OF PREBIOTIC SUPPLEMENTATION ON GROWTH PERFORMANCE, MEAT, QUALITY AND OXIDANTIVE STATUS OF BLOOD *

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Abstract

This study was conducted during summer season to investigate the effect of adding mannan-oligo-saccharide (MOS) to the diet or drinking water on the growth performance and some biological values like, total lipids, triglycrides cholesterol and some antioxidants enzymes in plasma and meat of broiler chickens from 1 day till 40 days of age. Two hundred eighty-1-d-old broiler chicks were randomly divided into seven treatment groups with four replicates of 10 birds each. Chicks were fed on corn-soybean meal basal diets during starting (1-10d), growing (11-24d) and Finishing (25-40d) periods. All birds were kept under similar management conditions. The experimental treatment groups were as follows: 1- A control group without MOS, group2 received a diet supplemented with MOS 1g/kg and groups 3 to 7 received the basal diet and had MOS in drinking water at the rate of (0.40 g/L, 0.45 g/L, 0.55 g/L and 0.60 g/L).The results showed that the highest ($P < 0.001$) body weight and body weight gain was recorded for the group fed on 1gm MOS/kg diet and also the other group treated with MOS in drinking water recorded significant ($P < 0.001$) increased in BW & BWG compared with control. Similar trend was nearly obtained for feed conversion ratio (FCR).No significant differences have been recorded in carcass and part yield or abdominal fat in treated groups. Also there were no significant differences in total lipid or cholesterol HDL and LDL. The addition of the MOS led to increased MDA in treatments 1gm/kg diet and 0.60 gm/L (high level of MOS) and reduction in the rest of treatments compared with control. Also MOS increased significantly ($P < 0.001$) activity of GPx in treatments (0.40, 0.50,0.55 and 0.60g MOS/L) than the other treatments. Also GSR increased significantly ($P < 0.005$) in the almost treatments supplemented with MOS. There were no significant effects of MOS on cholesterol, HDL, LDL and T.G on meat lipid of birds in any treatment. There was a significant ($P < 0.001$) increased pH meat in all treatments supplemented with MOS, also MDA in the meat showed significant increased ($P <0.001$) in treatment supplemented with high level of MOS (0.60 gm/L) in drinking water. It could be concluded that treated broilers with high level of MOS reduced the negative effects of heat stress and it hence improvements the growth performance.

Key Words: Mannan-oligosaccharide-performance-lipid antoxidant-broilers.

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INTRODUCTION

Heat stress is one of the most serious climatic problems of the tropical and subtropical regions of the world. It negatively affects the production performance of poultry and livestock. Heat stress is characterized by endocrine disorders, reduced metabolic rate, lipid peroxidation, decreased feed consumption, body weight gain, higher feed conversion ratio and intestinal microbial dysbiosis (Sohail *et al*., 2010).

Prebiotics such as mannan oligosaccharide (MOS) is derived from mannans on yeast cell surface. The benefits of MOS are based on specific properties, including modification of the intestinal micro-flora, reduction turnover rate of the intestinal mucosa and modulation of the immune system in the intestinal lumen. These properties have the potential to enhance growth rate and feed efficiency in poultry species (Parks *et al*., 2001).

Some authors have determined that feeding poultry prebiotics has been advantageous in improvement of carcass and meat quality in broilers during the overall period (Zhang *et al*., 2005). However, others have not obtained any positive results regarding carcass traits in broilers from 0 up to 42d of age (Wald roup *et al*., 2003). However, abdominal fat are waste products to poultry processor. The yield of cut-parts changes as a bird grows and is of considerable importance in deciding the optimal weight for slaughter, estimating accurate nutrient requirements, and evaluating nutritional effects.

The intestinal microbiota is generally considered important for its beneficial role in host nutrition, health and immunity (Sohail *et al*., 2010). It is believed that during stressful conditions, the intestinal microbial ecology is disturbed, leading to dybiosis. The intestinal microbial ecology can be restored using prebiotics, such as mannan-oligosaccharides (MOS). Food plays a vital role in upholding the oxidative system, and most of the antioxidants come from either food or the gut microbiota (Mikeisaar and Zilmer, 2009).

Considerable attention has been paid to test the potency of growth promoters on altering lipid metabolism, because World Health Organization suggest that excess fat deposition is undesirable in human body which ended in fetal diseases like atherosclerosis. Nowadays, consumers are also well aware of this fact and prefer lean meat. On the other hand, excess fat is an economic burden to poultry producer's, because fat is lost during processing of the carcass resulting in lower meat yields and furthermore the discarded abdominal fat. Recent reports suggest that feeding anoligosaccharide, a prebiotic, reduced the serum cholesterol and abdominal fat of broiler chicken (Yusrizal and Chen, 2003).

However the effect of prebiotic is scanty, hence the present study was undertaken to study the effect of MOS, extracted from yeast cell wall on performance, carcass traits, endogenous antioxidant enzymes, abdominal fat, plasma total cholesterol, high density lipoprotein (HDL) cholesterol, low density lipoprotein (LDL) cholesterol and triglycerides levels in broiler chicken under summer season conditions.

MATERIALS AND METHODS

Experimental Design:

A total of 280 one-day-old Arbor Acres broiler chicks were individually weighed and randomly divided into 7 treatment groups with 4 replications (n=10). All birds were housed in battery cages with similar managerial conditions during summer season. Feed and water were provided for *adlibitum* consumption throughout the experimental period. Experimental groups were fed on corn-soybean meal basal diets which met the strain requirements. The composition and calculate analysis of the basal diets during the experimental periods (starter, grower and finisher) are shown in table (1). Maximum and minimum air temperature and relative humidity were recorded daily and were averaged for each growth interval and the total growth trait are shown in table (2). Different levels from natural product of yeast cell walls in form of (Commercial Suspension) were used in this experiment. Chicks in the 1st group fed control basal diet during three rearing periods. Chicks in the 2nd group fed control basal diet supplemented with 1g MOS per kg. diet. The other groups fed basal diet plus different levels of MOS in drinking water from one-day old till the end of experiments periods as follows:

Group	Treatments
1	Control (basal diet).
2	Basal diet + 1gm MOS/Kg diet.
3	Basal diet + 0.40 gm/MOS/L
4	Basal diet + 0.45 gm/MOS/L
5	Basal diet + 0.50 gm/MOS/L.
6	Basal diet + 0.55gm MOS/L.
7	Basal diet +0.60 gm MOS/L.

Measurements:

1- Growth performance traits:

Individual live body weight (LBW) and live weight gain for each experimental period (starter, grower, finisher and total). Also feed intake (FI) was recorded for each

corresponding growth phase. Feed conversion ratio (FCR) was calculated as the ratio between feed consumed and live weight gain.

2- Carcass traits:

At the end of the growth experiment (40d of age) four birds from each treatment, approximate to the average final BW were assigned for slaughter. Carcasses were eviscerated and weighed. Relative weight of carcass, liver, gizzard, heart and abdominal fat were proportioned to live weight treatments. Also four right breast muscles of carcasses from each treatment were upon slaughtering and chilled on 4°C for 24hrs. Ultimate pH was measured using pH meter, provided by a temperature control system by probe method. After incision of the muscle, meat samples on minimum depth of one cm were taken and frozen at -20°C until analyzed for assaying total cholesterol (T.C), (HDL) cholesterol, (LDL) cholesterol and malondialdehyde (MDA) by colorimetric methods using analytical kits produced by Biodiagnostic company.

3- Blood biochemical analysis:

Three blood samples from each treatment were collected in heparinized tubes during slaughter, immediately centrifuged at 3000 rpm for 15 minutes to separate plasma. Plasma samples were stored at -20°C until analyzed to determine 1-total lipids (TL), (TC), (HDL) cholesterol and (LDL) cholesterol, 2-some indicators including total antioxidant capacity (TAOC) and MDA antioxidantive. 3-some antioxidant enzymes includingglutathione peroxidase (GPx), glutathione endogenous (GSR), catalase and alkaline phosphatate (alk. phos), the previous parameters were determined by using analytical procedures approved by Biodiagnostic company.

- Statistical analysis:

Data of experimental treatments were analyzed by using one way analysis of variance. Variables showed significant differences at f-test were compared to each other's using Duncan's Multiple Range test (Ducan, 1955). The statistical procedures were computed using SPSS (2007).

RESULTS AND DISCUSSION

1- Growth performance:

Data listed in table (3) show significant increases in BW and BWG for studied intervals with providing MOS (diet or water) to chicks compared with control group. It is of interest that, the highest ($P < 0.001$) BWG was recorded for chicks fed on 1g/kg MOS (group 2) especially in the starter and finisher period. A similar trend was nearly obtained for FI (table 4)).All levels of MOS significantly ($P < 0.001$) increased FI in

finisher period compared with the control. Also MOS levels significantly ($P < 0.001$) improved FCR in the starter phase and not later (table 4). These results are in full agreement with those obtained by Benites *et al*. (2008) who found that birds given MOS at 1.0/0.5/0.5kg/ton diets (starter/grower/finisher) significantly give higher BW at 42d than birds fed control respectively. Also, Silva, *et al*. (2010) found that supplementing MOS improved BWG and FCR of broilers kept under hat stress conditions (HS). Also Sohail, *et al*., (2010) observed a significant decrease in growth performance in broilers kept under chronic HS, but supplementation of prebiotic alone or as a synbiotic ameliorated these side effects of HS on the broilers. Deteriorated performance of HS broilers can be attributed to greater expenditure of energy for physiological adaptation to the stress condition instead of for growth enhancement. Alternatively, it is believed that less broiler weight gain during, HS conditions is due to a less appetite and lower feed intake, as it may be a defense mechanism to help reduce heat production, henceoligosaccharides improve appetite and feed consumption in broilers which eventually increase BW gain and feed efficiency (Gao *et al*., 2008).

Keeping these argument in view, it is safe to assume that supplements improved nutrient absorption from the intestine and counter balanced the negative effect of HS. In the current study MOS significantly improved the performance of broilers under summer season.

2- Meat yields:

The effects of treatments on carcass traits are presented in table (5). MOS supplementation had significant effect on carcass, giblets (liver, heart and gizzard), and abdominal fat. These results are in agreement with Waldroup *et al*., (2003) who reported that MOS did not affect carcass and part yield as well as abdominal fat in broilersor turkeys. In contrast, Shafey *et al.,* (2001) reported that MOS and probiotic supplementation increased the abdominal fat in broilers they suggested that environmental and stress status influencedthe efficacy of prebiotics and is more effective when the animal is producing well below its genetic potential.

3- Plasma lipid profile:

Results in Table (6) show that there was no significant differences in total lipid, TC, HDL cholesterol and LDL cholesterol of different MOS experimental groups. Plasma total cholesterol concentrations were lower in most treatmentswhen compared with control but this decreases was not significant.

The decrease in cholesterol level could be due to the cholesterol assimilation by lactobacillus (Gilliland *et al*., 1985), as the prebiotic supplementation could have

enhanced the lactobacilli count. MOS is considered as substrate for lactic acid producing bacteria like lactobacillus *Spp*. and Bifidobacterium bifidum. Gilliland *et al*., (1985) hypothesized that some lactobacillus *Spp*. are able to incorporate cholesterol into the cellular membrane of the organism, thus, cholesterol assimilation by lactobacillus in turn reduce cholesterol absorption in the system.

4- Antioxidant enzyme activity:

Data on antioxidative status indicators of the broilers are presented in Table (6). MOS supplementation led to an increase in MDA value in treatments 1g/kg/diet and0.60 g/L (high level of MOS), while a reduction in the rest of treatments compared with control. MOS increased significantly ($P < 0.001$) the activity of GPx in [0.40 , 0.50, 0.55 and 0.60 (g/MOS/L)] compared to control. Also GSR increased significantly ($P<0.005$) in most of treatments supplemented with MOS. Whereas MOS treated did not reveal any noticeable changes in the activities of TAOC, catalase and Alk.Phos in the broilers compared with control. Shain *et al*., (2010) reported a decline in the antioxidant defense system with significant decrease in glutathione peroxidase and catalase concentration in broilers reared under HS. Also they demonstrated a significant increase in the activity of antioxidant enzymes during HS. Supplementation with the synbiotics, either partially or significantly ameliorated oxidative damage. It is not yet clear how supplementation of MOS modulated the dynamics of oxidants and antioxidants, however was hypothesized that these supplements might have improved gut microbes and that these microbes, in turn, released some bioactive substances that could potentially prevent oxidative damage.

The study by (Czech and Ognik 2010) showed that an addition of a mixture of synthetic antioxidants does not change the content of malonedialdehyde(MDA) which consider the final product of lipid oxidation in hen'sblood.

Catalase is an enzyme responsible for reducing hydrogen superoxide to water and oxygen. Numerous scholars stated that an increase in the activity of catalase in the blood is caused by environmental burdens to which birds are exposed during their growth. Oryczak *et al*. (2001) observed that reduced catalase activity typically occurs at the beginning of a pathological condition, while it increases after recovery or during chronic condition. Generally, stressful situations and diseases are accompanied by a higher activity of catalase. A higher total antioxidtive potential in the blood plasma of the control birds, however, may be a reflection of the birds adaptation to oxidative stress.

5- Meat lipid profile, MDA and pH:

There were no effects of MOS on, cholesterol, HDL cholesterol, LDL cholesterol and TG of meat lipid, but there was significant ($P < 0.001$) increase in pH

with all levels of MOS, also the same trend was found in MDA in the high level only of MOS (0.60 g/L) while the rest of treatments equal to control group Table (7). This results agree with Stanley *et al*., (1997) who reported that addition of MOS_s to broiler diets did not significantly affect cholesterol. Re-elevation of the cholesterol content in the groups fed higher levels MOS suggested that this may be attributable to inhibition of lactobacillus populations by other factors in the intestinal environment. Although no significant differences were observed in HDL cholesterol, LDL cholesterol and T.G between the groups in the present study, Kannan *et al*. (2005) reported that triglycerides were not influenced by dietary MOS treatments. Juskiewicz *et al*. (2006) reported that MOS changed caecal metabolism more markedly at early ages in broilers chicken. Also reported some positive effects of adding MOS to the diet, such as lowering ammonia concentrations and decreasing β-glucuronidase activity in the caeca as well as some negative effects, including decreased bacterial glycolytic activity and raised pH of digesta. However, lower pH of digesta is probably responsible for the proliferation of beneficial species of bacteria and the depression of pathogenic species in the lower gut of animals. Hence dietary MOS supplementation might be harmful in part to of gastrointestinal system.

In conclusion results of the present study suggest that dietary supplementation of MOS may reduce some of detrimental effects of heat stress in terms of reduced oxidative damage and improved body weight gain in broilers.

Table 1. Ingredient composition and calculated chemical analysis of the basal diet.

Composition (per 100 kg)	Starter (1-10 day)	Grower (11-24 day)	Finisher (25-40 day)
Yellow corn	52.28	59.05	63.19
Soybean meal (44% CP)	34.00	26.70	22.50
Corn gluten (60% CP)	6.00	7.00	6.30
Soy bean oil	3.00	3.00	4.00
Di- calcium phosphate	1.84	1.67	1.59
Limestone	1.43	1.20	1.10
L-Lysine HCl	0.32	0.31	0.28
Dl-Methionine	0.26	0.20	0.17
Sodium chloride	0.24	0.24	0.24
Sodium bicarbonate	0.23	0.23	0.23
Vitamins premix*	0.10	0.10	0.10
Minerals premix**	0.30	0.30	0.30
Total	100.00	100.00	100.00
Calculated analysis (%)			
Crude protein	23.17	21.25	19.04
Metabolizable energy (Kcal/Kg)	3100	3110	3207
Ether extract	5.63	5.08	6.88
Crude fiber	3.8	3.45	3.22
Calcium	1.04	0.90	0.84
Av. Phosphorus	0.50	0.45	0.43
Lysine	1.44	1.24	1.09
Methionine	0.68	0.60	0.54
Methionine + cysteine	1.06	0.95	0.86
Sodium	0.15	0.16	0.17

* Supplied per kg of diet: Vit. A, 11000 IU; Vit. D3, 5000 IU; Vit. E, 50 mg; Vit K3, 3 mg; Vit. B1, 2 mg; Vit. B2, 6 mg; B6, 3 mg; B12, 14 mcg; Nicotinic acid 60 mg; Folic acid 1.75 mg; Pantothenic acid 13 mg and biotine 120 mcg.

** Supplied per kg of diet: Choline chloride 600 mg; Copper 16 mg; Iron 40 mg; Manganese 120 mg; Zinc 100 mg; Iodine 1.25 mg and Selenium 0.3 mg.

Table 2. Average of environmental temperatures (ET) and relative humidity (RH) during the different experimental periods.

Period	ET °C		RH %	
	Minimum	Maximum	Minimum	Maximum
Starting (1-10 day)	37	39	20	55
Growing (11-24 day)	36	38	30	45
Finishing (25-40 day)	36	37	30	35
Overall period (1-40 day)	36.3	38	26.5	45

Table 3. Effect of different levels of MOS on live body weight and weight gain of broiler chicks during different experimental periods.

Treatments	Live body weight (g)			Body weight gain (g)			Overall 1-40d
	Starter 1-10d	Grower 11-24d	Finisher 25-40d	Starter 1-10d	Grower 11-24d	Finisher 25-40d	
Control	162.55^{b}	672.50^{c}	1456.88^{d}	121.18^{b}	509.95^{c}	784.38^{d}	1415.50^{d}
MOS 1g/kg	177.20^{a}	741.88^{ab}	1730.25^{a}	135.95^{a}	564.68^{ab}	988.38^{a}	1689.00^{a}
MOS 0.40 g/L	187.93^{a}	791.38^{a}	1698.75^{ab}	147.05^{a}	603.45^{a}	907.38^{bc}	1657.88^{ab}
MOS 0.45 g/L	177.08^{a}	757.88^{ab}	1684.38^{ab}	136.20^{a}	580.80^{a}	926.50^{abc}	1643.50^{ab}
MOS 0.50 g/L	179.38^{a}	687.38^{c}	1639.00^{bc}	138.13^{a}	508.00^{c}	951.63^{ab}	1597.75^{bc}
MOS 0.55 g/L	181.30^{a}	742.88^{ab}	1635.13^{bc}	140.18^{a}	561.58^{ab}	892.25^{bc}	1594.00^{bc}
MOS 0.60 g/L	184.38^{a}	711.38^{bc}	1582.75^{c}	143.60^{a}	527.00^{bc}	871.38^{c}	1541.98^{c}
SE	1.46	7.03	11.98	1.46	6.61	9.29	11.99
Significance	0.001	0.001	0.001	0.001	0.001	0.001	0.001

a,b,….. Means in the same column with different superscripts, differ significantly ($P \leq 0.5$), N.S = Not significant ($P > 0.05$)

Table 4. Effect of different levels of MOS on feed intake and feed conversion ratio of broiler chicks during different experimental periods.

Treatment	Feed intake (g)			Overall 1-40d	Feed conversion ratio			Overall 1-40d
	Starter 1-10d	Grower 11-24d	Finisher 25-40d		Starter 1-10d	Grower 11-24d	Finisher 25-40d	
Control	174.48	810.87	1242.50^{b}	2227.85^{c}	1.44^{a}	1.60	1.60	1.58
MOS 1g/kg	179.35	844.50	1472.00^{a}	2495.85^{ab}	1.32^{b}	1.51	1.49	1.48
MOS 0.40 g/L	194.85	84088	1501.50^{a}	2537.23^{a}	1.33^{b}	1.40	1.66	1.53
MOS 0.45 g/L	177.85	826.63	1385.00^{ab}	2389.48^{abc}	1.31^{bc}	1.43	1.49	1.45
MOS 0.50 g/L	181.60	744.17	1469.48^{a}	2395.25^{abc}	1.32^{b}	1.48	1.54	1.50
MOS 0.55 g/L	180.35	822.50	1298.25^{b}	2301.10^{bc}	1.29^{bc}	1.47	1.46	1.44
MOS 0.60 g/L	182.10	754.75	1309.00^{b}	2245.85^{c}	1.27^{c}	1.43	1.50	1.46
SE	1.80	13.57	24.53	31.83	0.01	0.03	0.03	0.02
Significance	N.S.	N.S.	0.006	0.036	0.001	N.S.	N.S.	N.S.

a,b,….. Means in the same column with different superscripts, differ significantly ($P \leq 0.5$), N.S = Not significant ($P > 0.05$).

Table 5. Carcass characteristics of broiler chickens fed different levels of MOS at 40 days of age.

Treatments	Carcass %	Liver %	Gizzard %	Heart %	Abdominal fat %
Control	64.25	2.46	1.74	0.53	1.68
MOS 1g/kg	64.76	2.28	1.45	0.51	1.84
MOS 0.40 g/L	64.59	2.42	1.61	0.48	1.63
MOS 0.45 g/L	65.03	2.57	1.61	0.52	1.97
MOS 0.50 g/L	64.76	2.67	1.39	0.52	1.71
MOS 0.55 g/L	64.76	2.53	1.48	0.49	1.64
MOS 0.60 g/L	62.56	2.40	1.41	0.51	1.57
SE	0.75	0.05	0.04	0.01	0.07
Significance	N.S.	N.S.	N.S.	N.S.	N.S.

a,b,….. Means in the same column with different superscripts, differ significantly ($P \leq 0.5$), N.S = Not significant ($P > 0.05$).

Table 6. Effect of different levels of MOS on plasma component and antioxidant enzymes of broiler chicks during different experimental periods.

Treatments	Plasma lipid profile				Plasma antoxidant parameters					
					Components		Enzymes			
	T.L (mg/dl)	Chole sterol (mg/dl)	HDL (mg/dl)	LDL (mg/dl)	TAOC (n mol/l)	MDA (n mol/l)	GPx (mg/ml)	GRS (u/l)	Catalase (u/l)	Alk.phos (mg/l)
Control	500.00	159.19	63.25	183.33	0.84	4.05^{ab}	324.22^{b}	7.70^{ab}	266.45	379.64
MOS 1g/kg	524.69	142.36	59.43	228.14	0.96	2.47^{b}	291.80^{b}	9.71-ab	243.23	366.09
MOS 0.40 g/L	751.03	160.13	59.48	215.26	1.20	1.92^{b}	616.02^{b}	7.03^{ab}	100.61	360.03
MOS 0.45 g/L	794.24	146.80	53.00	21.63	0.96	1.61^{b}	389.07^{b}	10.38^{a}	222.22	273.91
MOS 0.50 g/L	590.53	147.88	64.60	226.59	1.22	4.27^{ab}	616.03^{b}	10.05^{a}	340.52	320.53
MOS 0.55 g/L	664.61	152.59	62.21	211.14	0.91	2.79^{b}	1280.68^{a}	3.01^{c}	367.61	377.75
MOS 0.60 g/L	672.84	161.48	59.26	205.99	0.95	8.10^{a}	1491.43^{a}	6.03^{bc}	567.71	379.24
SE	34.85	3.66	1.91	6.14	0.10	0.62	106.93	0.66	48.64	11.45
Significance	N.S	N.S	N.S	N.S	N.S	0.045	0.001	0.005	N.S	N.S

a,b,….. Means in the same column with different superscripts, differ significantly ($P \leq 0.5$), N.S = Not significant ($P > 0.05$).

Table 7. Effect of different levels of MOS on meat lipid profile and pH of broiler chicks during different experimental periods.

Treatments	Cholesterol (mg/dl)	HDL (mg/dl)	LDL (mg/dl)	TG (mg/dl)	DMD (n mol/l)	Ph
Control	12.70	0.90	6.65	25.68	33.28^{b}	7.26^{b}
MOS 1g/kg	19.16	0.98	9.09	45.43	33.30^{b}	8.10^{a}
MOS 0.40 g/L	20.85	0.93	9.96	49.78	34.79^{b}	8.00^{a}
MOS 0.45 g/L	24.76	1.46	12.43	54.35	33.27^{b}	8.17^{a}
MOS 0.50 g/L	23.70	1.56	11.05	5.48	36.59^{b}	8.16^{a}
MOS 0.55 g/L	19.89	1.00	12.43	32.31	38.03^{b}	8.07^{a}
MOS 0.60 g/L	16.51	0.77	10.17	27.83	55.84^{a}	8.18^{a}
SE	1.44	0.10	0.68	4.92	1.93	0.07
Significance	N.S.	N.S.	N.S.	N.S.	0.001	0.001

a,b,….. Means in the same column with different superscripts, differ significantly ($P \leq 0.5$), N.S = Not significant ($P > 0.05$).

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زيادة نشاط النظام المضاد للأكسدة لكتاكيت التسمين خلال فصل (الصيف)
٢- تأثير إضافة البروبيوتك على الأداء الإنتاجي وجودة اللحم وحالة الأكسدة في الدم

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أجريت هذه الدراسة خلال فصل الصيف وكان الهدف من هذه الدراسة دراسة تأثير إضافة المنان أوليجوسكرايد في العلف وأيضا في مياه الشرب على الأداء الإنتاجي وبعض التقديرات الفسيولوجية مثل الدهون الكلية والجلسريدات الثلاثية والكوليسترول وبعض الإنزيمات المضادة للأكسدة في كل من بلازما الدم واللحم في كتاكيت التسمين من عمر يوم حتى ٤٠ يوم وهي فترة التجربة.

استخدم في هذه الدراسة عدد ٢٨٠ طائر من نوع اربرايكرز عمر يوم ووزنت وقسمت عشوائيا على ٧ معاملات كل معاملة ٤ مكررات كل مكرر ١٠ كتاكيت غير مجنسة، وغذيت الكتاكيت على عليقة قاعدية خلال فترة البادى (١-١٠ يوم)، وفترة النامي (١١-٢٤ يوم) والناهي (٢٥-٤٠ يوم) ووضعت كل الكتاكيت تحت نفس ظروف الرعاية. وكانت المعاملات كالآتي:

١- المجموعة الأولى (الكنترول) بدون أي إضافات.

٢- المجموعة الثانية وضع في العليقة الأصلية ١جم/كجم منان أوليجوسكرايد.

ومن المعاملة الثالثة حتى السابعة تم وضع المنان أوليجوستريدبهذه النسب ٠.٤٠، ٠.٤٥، ٠.٥٠، ٠.٦٠ جم لكل لتر ماء.

وخلال فترة التجربة حتى عمر ٤٠ يوم تم دراسة وأخذ وزن الجسم ومعدل الزيادة في الوزن وحساب كمية الغذاء المأكول وحساب معامل التحويل الغذائي وتم أخذ عدد ٤ طيور/بمعاملة وتم ذبحها في نهاية التجربة لتقدير مكونات الذبيحة وأخذ عينات دم لتقدير بعض التقديرات الفسيولوجية.

أوضحت النتائج الآتي:

١- زيادة الأوزان الكلية ومعدلات النمو للطيورالمعاملة عن الكنترولوكان أعلى معدل نمو للمعاملة الثانية وهي ١جم منان لكل كجم علف وأيضا حدث تحسن في معامل التحول الغذائي لهذا المستوى أيضا.

٢- لم تتأثر تأثير معنويا مكونات الذبيحة ولا دهن البطن بهذه الإضافة في كل من العليقة ولا الماء ولم تختلف عن المعاملة الكنترول.

٣- أيضا لم تتأثر كل من الدهون الكلية والكوليسترول والدهون عالية ومنخفضة الكثافة في بلازما الدم بهذه الاضافات في العليقة ومياه الشرب.

٤- أدت المعاملات بالمنان أوليجوسكرايدات إلى تحسن معنويا في إنزيم الجلوتاثيونبروكسيدير في بلازما الدم وكذلك تأثر إنزيم الجلوتاثيونريتااكدس في بعض المعاملات المضافة إليها المنان ولم يتأثر كلا من الكتاليز أو الاكالين فوسفايز وأيضا أنزيم الـــــــــ Total Antioxidant Capacity (TAOC).

٥- أما بالنسبة لعضلة الصدر فلم يؤثر المنان في نسب كلا من الكوليسترول أو الدهون الثلاثية فيما عداMDAحدث له ارتفاع طفيف عن المعاملة الكنترولفي بعض معاملات المنان لكن حدث ارتفاع بالنسبة لدرجة pH في كل معاملات المنان وهو ارتفاع معنوي.

والتوصية الهامة من هذه الدراسة هي إضافة المنان أوليجوسكرايدات بنسب معتدلة أو عالية في علائق دجاج التسمين لتقليل التأثيرات السلبية للإجهاد الحراري وينعكس ذلك تحسين الإداء الإنتاجي وزيادة وزن الجسم في دجاج التسمين.