Influence of the concurrent use of beneficial bacteria and phosphorylated mannanoligosaccharids on some hematological and biochemical parameters and performance broiler chickens

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Abstract
A feeding trial was conducted to investigate the effects of dietary supplementation of prebiotic (mannan oligosaccharide, MOS), Probiotic (Saccharomyces cerevisiae Lactobacillus acidophilus, Bacillus sutili, Streptococcus faecium) and their combination (synbiotic) on growth performance, some carcass traits , blood picture, serum glucose, calcium and phosphorus levels, liver function, histopathological changes affecting the liver and kidney in broilers. One hundred, one day-old broiler chicks (sasso), were randomly assigned to 4 dietary treatments (25 birds/treatment) for 62days. Treatment groups were as follow: 1. Basic diet (control); 2. Basic diet plus prebiotic (Mannan-Oligosaccharide MOS) 3. Basic diet plus probiotic (Saccharomyces cerevisiae) and 4.Basic diet plus the combination of pre and probiotics (synbiotic). The final BW, Breast muscle percentages, carcass percentage were significantly ($P<0.05$) increased in synbiotic, probiotic and prebiotic supplemented broilers in comparison with the control. There were only significant increased in RBCs hemoglobin and PCV in prebiotic and Synbiotic groups. The total white blood cell and lymphocytes counts were significant increased ($P<0.05$) by dietary supplementation with the additives in comparison with the control values. Serum total cholesterol and triglycerides were significantly decreased in all dietary treatments compared with the control birds. Supplementation of broiler diets with pre, pro and synbiotics significantly improved body weight, weight gain and feed conversion, and some carcass traits, compared with the un-supplemented control. The results of the present study demonstrated that synbiotic as growth promoters appeared to be superior compared to use pre or probiotic alone in optimizing digestion to convert feed into body mass more efficiently and improve broiler chickens growth performance.

Key words: *Probiotic, synbiotics, Mannan-Oligosaccharide MOS.*

Introduction

Recently, using natural growth promoters as alternatives for antibiotics is promising new future in the poultry production. Starting in 2006, the prophylactic use of antimicrobial growth promoters in the animal feed is banned due to increasing resistance of pathogenic bacteria against antibiotic. International institutions and organizations related to public health are showing deep concern to reduce the use of antibiotics in the feed of animals and poultry. Using probiotics or prebiotics instead of antibiotics is increased in order to improve the useful microbial population of gastrointestinal tract (**Kermashahi and Rostami, 2006).** Increased bacterial resistance to antibiotics in humans has caused an increase in public and governmental interest in eliminating sub-therapeutic use of antibiotics in livestock. An alternative approach to sub-therapeutic antibiotics in livestock is the use of probiotic micro-organisms, prebiotic substrates that enrich certain bacterial populations, or synbiotic combinations of prebiotics and probiotics. Prebiotics such as inulin, Fructo-oligosaccharides (FOS), Isomaltooligosaccharides (IMO) and Mannan Oligosaccharides (MOS) have been defined by **Gibson and Roberfroid (1995)** as non-digestible food ingredients that selectively stimulate the growth and activity of one or a limited number of bacteria in the intestine that can improve the host health **(Gibson and Roberfroid, 1995)**. These fermentable substrates are not hydrolyzed by the host digestive

enzymes and pass intact in the lower digestive tract. Prebiotics have been reported to produce a beneficial effect upon the animal that receives them. This is due to the proliferation of certain beneficial bacteria such as Bifidobacterium sp. and Lactobacillus sp. or an increase in their metabolic activity **(Gibson and Roberfroid, 1995)**. Inulin, FOS and IMO are reported to be substrates for certain species of beneficial bacteria **(Chung and Day, 2004)**. MOS had the ability to block the colonization of the pathogens as E. coli and Salmonella sp., by blocking the ability of these bacteria to connect via their fimbriae, with the intestinal epithelial cells and therefore facilitating their excretion **(Spring *et al*., 2000; Duncan *et al*., 2005)**. Also, the MOS have a positive effect on the immunity preventing the infections **(Shashidahara and Dewegowda, 2003). Gong *et al*. (2002)** define probiotics as health-promoting bacteria inhabiting the gastrointestinal tract of humans and animals. The major probiotic strains include Lactobacillus, Saccharomyces, Bacillus, Streptococcus and Aspergillus **(Tannock, 2001)**. Positive effects of probiotics on animals can result either from a direct nutritional effect of the probiotic, or a health effect, with probiotics acting as bioregulators of intestinal microflora and reinforcing the host's natural defenses.

There have been numerous studies in humans and animals on the ability of probiotics to change the types and numbers of gut microflora (**Endo *et al*., 1999).** Moreover, Saccharomyces cerevisiae could act as bioregulator of the intestinal micro flora and reinforcing the host natural defenses, through the sanitary effect by increasing the colonization resistance and stimulation of the immune response (**Line *et al*., 1998)**. Mannan oligosaccharides and 1,3/1,6 - glucan are components of the yeast cell wall that modulate immunity (**Shashidahara and Dewegowda, 2003**), promote growth of intestinal microflora (**Spring *et al*., 2000**) and increase growth (**Parks *et al*., 2001**). The combination of a pre- and probiotic in one product has been shown to confer benefits beyond those of either on its own (**Gallaher and Khil, 1999**). Synbiotics is defined as a mixture of probiotics and prebiotics that beneficially affects the host by activating the metabolism of one or a limited number of health promoting bacteria and/or by selectively stimulating their growth improving the host's welfare (**Gibson and Roberfroid, 1995**). **Zhang *et al*. (2006**) found that some probiotics or synbiotics were effective in increasing the body weight of chickens. In addition, **Mohnl *et al*. (2007**) found that the synbiotic product had a comparable potential to improve broiler performance as Avilamycin (an antibiotic growth promoter). It seems that synergistic effects of prebiotics and probiotics can be useful in stimulating beneficial bacteria and improving the health of the gut. However, there is scarce information available to date on synbiotics and its possible mechanisms in broiler chickens. Synbiotics include both beneficial micro-organisms and substrates, which may have synergetic effects on the intestinal tract of animals. Thus it may offer a considerable promise for growth promotion in poultry production and a new alternative to antibiotic growth promoters (**Patterson and Burkholder, 2003; Awad *et al*., 2008; 2009**). Therefore, the objective of this study was to investigate the effects of probiotic, (beneficial bacteria), prebiotic (phosphorylated mannanolig-osaccharids) and synbiotic (beneficial bacteria + phosphorrylated mannanoligosaccharids) supplemented diets on broiler growth performance, carcass measurements, blood picture, serum glucose, calcium and phosphorus levels, liver function, and histopathological changes affecting the liver and kidney in broilers chicks (sasso).

Materials and Methods

Birds and Housing:

A total number of 100 One day chicks (sasso) were obtain from a commercial hatchery. The bird were randomly divided into 4 groups (25 birds/group) and reared on a deep litter system at small farm.

The birds had free access to water and feed. The climatic conditions and lighting program followed the commercial recommendations. Environmental temperature in the first week of life was 32°C and decreased to 25°C until the end

of the experiment. During the first week, 22 h of light was provided with a reduction to 20 h afterward.

Dietary treatments:

The chicks were provided with free access to water and fed diets (The starter diet was fed for the first 3 weeks, while the grower from day 21 to41 and finisher from day 42 to 62) . The physical and the calculated chemical composition of the basal diets are illustrated in Table 1. The dietary treatments were: 1. Basic diet (control); 2. Basic diet +1 kg of prebiotic Bio-Mos® (Alltech Inc., Nicholasville, KY, USA) / ton of the feed ; the prebiotic Bio-Mos® is phosphorylated mannanoligosaccharids 3. Basic diet plus0.5kg of probiotic lactic dry® (LD Kanzy Medipharm, Egypt) /ton of the feed; the probiotics (lactic dry)was a combination of beneficial bacteria contained (Saccharomyces Servisia, Lactobacillus acidophilus, Bacillus subtili, Streptococcus faecium). 4. Basic Diet + 0.5kg of probiotic lactic dry® and1 kg of prebiotic Bio-Mos® /ton of the feed. The birds were fasted for 10-12 h prior to determination of the final body weight at slaughter.

Growth performance traits:

All birds were weighed individually at 7th day from the hatchery (initial weight) and every week tell the end of the experiment, the BW was recorded. Weight gain for each dietary treatment was calculated. Feed consumption was recorded in the course of the whole experiment for each treatment and the feed conversion rates were calculated subsequently. Mortality was recorded as it occurred and feed per gain values were corrected for mortality (regarding feed intake).

At the end of experiment, after weighing, 10 birds per treatment were randomly selected and slaughtered afterward the bird were scalded, defeathered, and carcasses were eviscerated, the head, neck and feet were removed, and the carcass subsequently was ready to cook. The ready to cook carcass percentage was calculated in relation to the live body weight of birds. Breast muscle percentage was also determined for each group and was calculated relative to

Table (1). Composition and nutrient content of starter (d 1 to 21) and grower (d 22 to 41) and finisher (d42 to 62) basal diets for broiler chicks (%, as fed-basis)

Ingredients	Starter	Grower	finisher
Yellow corn	49.7	58.6	65.5
Soybean meal44%	30.5	25.5	20.4
Dicalcium phosphate	1.6	1.4	1.5
Lysine	0.3	0.3	0.3
Limestone	1.5	1.5	1.3
Salt (NaCl)	0.4	0.4	0.4
DL-Methionine	0.1	0.1	0.1
Corn gluten 60%	9	6.5	4.2
Soybean oil	6.6	5.4	4.2
Premix brioler	0.03	0.03	0.03
total	100	100	100

Mineral and vitamin premix Heromix broilers (Heropharma Co., Egypt).

Serum biochemistry and hematology:

At 62 days of age. Chickens were slaughtered and the blood was collected in EDTA and plain collection tubes. The collected blood samples were centrifuged at 2000 rpm for 10 min and the sera were collected, stored at -20°C until further analysis. Serum samples were assayed for estimation of total protein, albumin ,globulin, lipid (triglycerides, cholesterol, high density lipoprotein, low density lipoprotein) calcium, phosphorus, ALT and AST, alkaline phosphatase enzymes, by spectrophotometer using commercial test kits (Spectrum, Cairo, Egypt). Blood on EDTA were used for assessing blood picture. were carried out according to (**Jain, N.C. (1986)**.

Histopathological studies:
At 62 days of age. Chickens were slaughtered, specimens of the liver and kidney were collected from five birds for each dietary treatment and directly fixed in 10%neutral formalin then specimens prepared and examine microscopically for lesions using simple histopathological techniques according to **(lilli 1948)**

Statistics:
The data were subjected to statistical analysis with one way ANOVA and t-test procedures. Probability values of less than 0.05 ($P<0.05$) were considered significant.

Results

Growth Performance
Effect of prebiotic and probiotic and their combination on initial BW, BW, average feed intake FI, Feed Conversion Rate (FCR) and mortality rate are demonstrated in table(2). The initial BW of chicks did not differ ($p>0.05$) between the dietary treatments. Birds supplemented with synbiotic exhibited a greatest ($p<0.05$) BW (1460.94±22.88) compared to probiotic group (1351.3±17.89) and control group (1383.34±14.90), however the prebiotic supplemented group had an intermediate (1398.4±15.99) values at d 62 of age. The average feed intake FI of all experimental groups showed no significant difference between dietary treatments. Feed Conversion Rate (FCR) was (improved) ($P<0.05$) for birds supplemented with synbiotic(2.18) and followed by prebiotic (2.23) and probiotic (2.29) supplemented birds in comparison with control (2.41). The mortality rate was numerically lower for all the dietary treated groups in comparison with the control group.
Effect of prebiotic and probiotic and their combination on dressing and breast muscle percentages of broiler chickens at the end of experiment (7-62day) are demonstrated in table (3).statistically, there was no difference in dressing percentage between the experimental groups but a slight improvement was observed in bird fed diets supplemented with three additives. Breast muscle percentages showed significant increase ($p<0.05$) in treated groups compared with that of control.

Serum biochemistry:
The data at (Table 4) showed that a day 62 serum total protein, albumen, globulin increased significantly ($P<0.05$) in synbiotic supplemented group in comparison with the control, prebiotic and probiotic supplemented groups. Glucose levels decreased significantly in prebiotic, probiotic and Synbiotic groups compared with the control. At day 62 there was a significant decrease in serum total cholesterol ,LDL and triglycerides in all dietary supplemented groups in comparison with the control one. HDL showed significant increase .Activity of enzymes such as serum AST and ALT and ALP were not influenced in all dietary supplemented groups in comparison with the control. Moreover, significant increased was recorded in calcium level in prebiotic and Synbiotic groups. Phosphorus level showed no significant difference between groups.

Hematology:
Data in table (5) showed effect of prebiotic and probiotic and their combination on blood picture of broiler chickens at day 62. There were only significant increased in RBCs hemoglobin and PCV in prebiotic and synbiotic groups. The total white blood cell and lymphocytes counts were significant increased ($p<0.05$) by dietary supplementation with the additives in comparison with the control values. No significant changes were recorded in other cellular count in all groups.

Histopathological finding:
Results revealed no histopathological changes affecting the liver and kidney of birds supplemented with prebiotic (BIO-MOS), probiotic and those supplemented with synbiotic , compared with controls at d 62 of age.

Table (2). Body weight, feed intake, feed conversion ratio and mortality of broilers given prebiotic, probiotcs and their combination.

Item	Control	prebiotic	Probiotic	Synbiotic
Average daily Feedintake(g)	53.66±5.70	50.9±3.56	51. 01±3.75	52.54±4.39
total Feed intake(g)	3065.65	2861.19	2833.52	2947.32
Initial body weight(g)	114.5±2.3	115.98±2.13	115.4±2.01	115.00±2.01
Final Body weight (g)	1383.34±14.90	1398.4±15.99*	1351.3±17.89*	1460.94±22.88*
Weight gain (g)	1268.84	1282.48	1235.9	1345.94
FCR	2.41	2.23	2.29	2.18*
Mortality (%)	4.12	1.34	2.65	1.34

Table (3). Effect of prebiotic and probiotic and their combination on dressing and breast muscle percentages of broiler chickens at the end of experiment (7-62 day).

Item	Control	prebiotic	Probiotic	Synbiotic
Final live Body weight (g)	1324.99±22.89	1363.4±34.99	1404.75±29.1	1410.2±15.9
Dressed carcass(g)	914.01±22.12	955.98±24.87	986.98±14.01	994.02±16.12
Dressing%	68.98±0.47	70.11±0.86	70.29±0.44	70.48±0.78
Breast muscle(g)	128.87±1.56	148.21±3.3*	151.0±2.01*	152.5±4.3*
Breast muscle%	14.09±0.31	15.50±0.23	15.29±0.24	15.34±0.13

Table (4). Effect of prebiotic and probiotic and their combination on biochemical parameters of broiler chickens at day 62

Total protein (g/dl)	5.73±0.88	5.65±0.31	5.84±0.17	6.81±0.06*
Albumin(g/dl)	2.23±0.41	2.22±0.15	2.45±0.50	2.88±0.12*
Globulin(g/dl)	3.49±0.23	3.16±0.53	3.77±0.22	3.97±0.12*
Glucose(mg/dl)	218.7±17.9	201.09±3.39*	199.92±4.86*	189.25±3.57*
T-cholesterol (mg/dl)	137.98±3.9	124.12±4.10*	125.39±4.98*	123.11±3.79*
HDL(mg/dl)	76.01±2.36	79.98±2.14*	77.32±3.13*	82.01±3.11*
LDL(mg/dl)	49.12±2.55	31.21±2.01*	35.35±1.64*	27.65±2.29*
Triglyceride (mg/dl)	76.97±2.01	60.97±2.39	64.76±2.45	61.10±1.69
ALT (u/l)	49.12±2.11	45.20±2.9	49.67±2.2	45.98±3.34
AST (u/l)	27.13±1.46	28.41±2.11	27.01±1.3	27.47±1.46
ALP(u/l)	39.01±2.39	37.42±1.22	38.68±2.2	38.20±1.21
Ca (mg/dl)	8.49±0.17	9.47±0.45*	8.31±0.08	10.56±0.69*
P (mg/dl)	5.16±0.21	5.13±0.33	5.25±0.17	5.49±0.86

Table (5). Effect of prebiotic and probiotic and their combination on blood picture of broiler chickens at day 62

Item	Control	prebiotic	Probiotic	Synbiotic
RBCs(10^6/µl)	3.12±0.22	3.91±0.25*	3.21±032	4.01±0.27*
HB(g/dl)	7.53±0.43	8.13±0.15*	7.61±0.32	8.22±0.45*
PCV(%)	34.15±0.99	35.22±0.43*	34.51±0.73	35.65±0.85*
WBC(10^3/µl)	22.73±0.88	23.91±0.35*	23.43±0.66*	23.98±0.36*
neutrophils(10^3/µl)	9.57±0.97	9.37±0.95	9.38±0.88	9.63±0.87
lymphocytes(10^3/µl)	12.15±1.14	13.22±1.96*	13.13±1.26*	13.25±1.49*
monocytes(10^3/µl)	0.53±0.11	0.54±0.14	0.52±0.15	0.51±0.08
eosinophils(10^3/µl)	0.15±0.05	0.15±0.06	0.14±0.05	0.16±0.06
basophils(10^3/µl)	0.35±0.08	0.36±0.08	0.35±0.07	0.34±0.09
Thrombocytes(10^3/µl)	251.01±12.4	248.01±13.26	247.02±14.1	246±16.31

Means with different superscript in the same row are significantly different ($P<0.05$).

Discussion

The primary role of a diet is not only to provide enough nutrients to fulfill metabolic requirements of the body but also to modulate various functions of the body. The alternatives to in feed antibiotics possibly can improve the health and performance of birds by increasing the growth of beneficial microbes or by reduction and removal of potential pathogens. Probiotics, prebiotics and synbiotics are either beneficial microorganisms or substrates that facilitate the growth of these microorganisms, which can be suitably used by the food manufacturers and hold considerable promise for the health care industry. At day 62 BW, weight gain and feed conversion efficiency was significantly improved in all dietary treatments in comparison with the control group. synbiotic supplemnted broilers are superior to probiotic and Prebiotic (MOS) birds. In the present study, the beneficial effects of a synbiotic, Prebiotic and probiotic product on broiler performance parameters including BW gain, FCR, and BW were in agreement with previous studies, **(Ferket *et al*., 2002; Ferket, 2004; Hooge, 2004; Benites *et al*., 2008).** Improvement in growth performance and feed efficiency in broilers chickens fed probiotic and synbiotic may be attributed to the total effect of probiotic action including the maintenance of beneficial microbial population (**Fuller, 1989),** improving feed intake and digestion (**Nahanshon *et al*., 1992)** and altering bacterial metabolism. The results of our study are supported by other studies (**Li *et al*., 2007; Mountzouris *et al*., 2007; Awad *et al*., 2008, 2009).** These studies reported that probiotics, prebiotics, synbiotics could enhance the performance of broilers by (1) improving intestinal morphology and microbial balance associated with suppressing intestinal pathogens, by competitive exclusion and antagonism, such as Salmonella, Camphylobacter and *E. coli* (**Kabir *et al*., 2005),** (2) increasing digestive enzyme activity and decreasing bacterial enzyme activity and ammonia production (**Jin *et al*., 2000),** (3) also by an increase in feed intake and the uptake of nutrients (fatty acids and glucose), (4) fixation of nitrogen and reduction of excretion of fat in feces and microbial urea (**Willis *et al*., 2007**). (5) Stimulating the immune system and reducing mortality (**Kabir, 2009).** Therefore, beneficial effects of these supplements in the gastrointestinal tract could result in an improvement of overall health and performance of animals. However, **Karaoglu and Durdag (2005)** used *Saccharomyces cerevisiae* as a dietary probiotic to assess performance and found no overall weight gain difference. Variations among reports of researches could be related to environmental conditions that be exist in various experiments. Furthermore, the mortality % was numerically decreased by dietary supplementation of prebiotic and synbiotic. These results are fully consistent with the results of(**Awad *et al*., 2008; Bozkurt *et al*., 2008; El- Banna *et al*., 2010; Falaki *et al*., 2011).**

In poultry industry, one of the major concerns is to obtain a higher percentage yield of saleable products and consequently, to increase the edible portions. The significant increase in the carcass weight and dressing % in synbiotic supplemented broilers was totally coincided with the observations of (**Awad *et al*., 2009)** who reported that carcass yield percentage was significantly increased in the synbiotic-fed broilers compared with the control and probiotic-fed broilers. In consistent with that prediction, in the present study, there are significant increases in the absolute weight of breast, in synbiotic supplemented group. This result was in agreement with(**Falak**i ***et al*.,2011). Kabir *et al*. (2004)** reported the occurrence of a significantly ($p<0.01$) higher carcass yield in broiler chicks fed with the probiotics on the 2nd, 4th and 6th week of age both in vaccinated and non-vaccinated birds.

In the present study, at day 62 serum total protein, albumen, globulin increased significantly ($p<0.05$) in synbiotic supplemented group in comparison with the control, prebiotic and probiotic supplemented groups. These finding are in agreement with those (**Dimcho *et al* 2005)** who found that probiotic supplementation did not affect the total proteins concentrations of chickens. Glucose levels decreased significant-

ly in prebiotic, probiotic and Synbiotic groups compared with the control. these results are in agreement with those found by (**Al-Kassie *et al* 2008**)who recorded similar results. The reduction of glucose could be due to the additions to chick diet that had positive effect, on birds which meant that those addition decreased stress factor on birds(**Al-Kassie *et al* 2008)**

At day 62 there was a significant decrease in serum total cholesterol, LDL and triglycerides in all dietary supplemented groups in comparison with the control one. These results are in agreement with those found by (**Zhao and Yang, 2005; Liong and Shah, 2006; Li *et al*., 2007)**. These studies have shown that probiotics and prebiotics exhibited lipid lowering properties which might be related to the changes in the intestinal bacterial flora composition, which ferments prebiotics to produce short-chain fatty acids in the gut and then causes a decrease in the systemic levels of blood lipids and cholesterol. Furthermore, some probiotic bacteria may interfere with cholesterol absorption in the gut by de-conjugating bile salts or by directly assimilating cholesterol (**Mohan *et al*., 1996; Jin *et al*., 1998;)** .lipid decreasing effect of synbiotic is more pronounced than probiotics and prebiotics.

Significant increased was recorded in calcium level in prebiotic and Synbiotic groups. Phosphorus level showed no significant difference between groups. Prebiotics have been linked to an enhancement of mineral absorption in large bowel (**Robarfroid 2000)**. Activity of enzymes such as serum AST and ALT and ALP were not influenced in all dietary supplemented groups in comparison with the control. Similar results were recorded by (**Panda *et al* 2003).**

There were only significant increased in RBCs hemoglobin and PCV in prebiotic and synbiotic groups. This was in agreement with the study done by **Al-Kassie *et al* (2008)**.moreover In previous studies by (**Ohta *et al*1995,& Ohta, *et al* 1998),** it was found that dietary prebiotics improved recovery from iron deficiency anemia in rats. Also it increased erythrocyte counts (RBC), hemoglobin (Hb) concentration, haematocrit (Hct) value and iron absorption. The total white blood cell and lymphocytes counts were significant increased ($p<0.05$) by dietary supplementation with the additives in comparison with the control values. These results indicate that dietary supplementation of prebiotic, probiotics and synbiotic stimulate immune function as previous recorded (**Gill *et al* 2001).** Also several studies were mentioned by (**Cotter *et al* 2000& Panda, *et al* 2003)** stated that probiotics had an effect on immunological parameters.

In conclusion the BW, weight gain, carcass yield percentage and feed conversion rate were significantly ($p<0.05$) increased by the dietary inclusion of the synbiotic, prebiotics and probiotic compared with the control. The results of the present study revealed that supplementation of broiler diets with pre, pro and synbiotics increased body weight gain and feed conversion, and, some carcass traits, biochemical parameter and hematology compared with the unsupplemented control. Combination of pre and probiotic (synbiotic) induced additive benefit in growth performance, feed conversion and carcass traits than that of individual use of these additives. Under present experimental condition, synbiotic as a growth promoter appeared to be superior compared to use pre or probiotic alone in optimizing digestion to convert feed into body mass more efficiently and improve broiler chickens growth performance. Therefore, these products might be promising alternatives for antibiotic growth promoters as pressure to eliminate antibiotic growth promoters in animal feed increases. The synbiotic offers a good alternative to improve poultry production.

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تأثير استخدام كلاً من البكتريا النافعة أو مينانوأوليجوسكرايد الفوسفورية أو الاثنين معاً علي بعض التغيرات الهيماتولوجية والبيوكيميائية وكفاءة النمو فى الطيور

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الملخص العربى

هذه الدراسة تم اجرائها لتقييم تأثير اضافة البكتريا النافعة (بروبيوتك)و مينانوأوليجوسكرايد الفوسفورية(بريبيوتك) وكذلك الاثنين معا فيما يسمي السنبيوتك الي علف بداري التسمين علي أداء النمو وبعض خواص الذبيحة وصورة الدم ومعدل الجلوكوز و الكالسيوم و الفوسفور في مصل الدم وكذلك وظائف الكبد و ايضا الفحص الباثولجى للكبد والكليتين.تم استخدام حوالي 100 من كتاكيت التسمين (ساسو) عمر يوم تم تقسيمها عشوائيا الي أربع معاملات(25 طائر لكل معاملة) لمدة 62 يوم.تم تغذية المجموعة الاولي علي عليقة متزنة (كنترول) بدون اضافات والمجموعة الثانية مضاف عليها1 كجم/طن علف بريبيوتك (Bio-Mos®), والمجموعة الثالثة مضاف عليها 5, كجم/طن علف بروبيتك(lactic dry®)اما المجموعة الرابعة فقد تمت تغذيتها علي عليقة محتوية نفس الكميات من البروبيوتك والبريبيوتك.اظهرت النتائج تحسن النمو ومعدل التحويل الغذائي ونسبة لحوم الصدر للمجموعات المغذاه علي علائق تحتوي علي الاضافات.ومن ناحية أخري لم يكن هناك تأثير ضار علي وظائف الكبد.وبالنسبة لحالة الدم فقد أظهرت النتائج زيادة في عدد كرات الدم الحمراء ونسبة الهيموجلوبين اذا ما قورنت بالكنترول. وكذلك كان هناك انخفاض ملحوظ في معدل الجلوكوز و الكوليسترول و الدهون المشبعة و البروتينات الدهنية ذات الكثافة القليلة في مصل الدم.في حين كان هناك زيادة في معدل الكالسيوم في مصل الدم للمجموعات المغذاة علي علائق محتوية علي البريبيوتك و كذلك المحتوية علي السنبيوتك. من هذة النتائج قد اتضح ان اضافة السنبيوتك قد اضاف منافع من حيث النمو ومعدل التحويل الغذائي وقد حسن من صورة الدم وبعض المقاييس الحيوية لبداري التسمين وذلك بمقارنتها باضافة البروبيوتك او البريبيوتك منفرداً.