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Comparison of effect of Cuminum cyminum and Probiotic on Performance and serum composition of broiler chickens

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ABSTRACT

The objective of this study was conducted to evaluate the effects of Cuminum cyminum and Probiotic on performance and serum composition of broiler chickens. A total of 400 one day- old male Ross-308 broiler chicks were allocated into 4 dietary treatments and 5 repetitions with 20 chickens in each group, including P1) basal diet with no supplement as control group P2) basal diet containing 1% probiotic(L. acidophilus and L. casei). P3) received 2% Cuminum cyminum P4) Basal diet with 1% probiotic and 2% probiotic. The results showed that the best result of the live weight and FCR of the treated groups was in P4 (P<0.05), but the highest feed intake was in group 3. As compared to the control group with the other groups observably to give improve performance in all of the experimental (P<0.05). The highest percent of liver and breast was observed in experimental group 4 and the highest percent of gizzard and lowest percent of abdominal fat were in experimental groups 2. According to the results, total cholesterol (Chol), triglyceride (TG), HDL, LDL and Glucose were measured in blood samples of day 42. The amount of total Cholesterol, triglyceride (TG), LDL and HDL in the serum showed significant differences, but glucose was not significantly different among groups.

Key words: Cuminum cyminum cholesterol, broiler, Probiotic, Broiler.

INTRODUCTION

It is conceivable that herbal agents could serve as safe alternatives to antibiotic growth promoters due to their suitability and preference of the broiler meet consumers, reduced risks and minimal health hazards. After many years, the long term side effects of these products like microbial resistance and increase of the blood cholesterol level in the livestock lead to the ban of these commercial antibiotics. Recently, alternatives for substituting these traditional growth promoters have been evaluated and probiotics have been the most studied. It is well recognized by this time that the probiotics are live microorganisms and when administered through the digestive tract, cause a positive impact on the host's health. Studies on the beneficial impact on poultry performance have indicated that probiotic supplementation

can have positive effects. [1,2].

Probiotic is defined as a microorganism or substance which contributes to the intestinal microbial balance [3-4]. The inclusion of probiotic to poultry diet results in a significant improvement in weight and feed efficiency [5-7]. Panda *et al*. [8] reported that probiotics cause the reduction of serum and yolk cholesterol and also increase of egg production.Probiotics prescription is a good alternative for antibiotics for several reasons: suitable function, nonexistence of residue in poultry productions, environmental protection and also prohibition of antibiotics usage in Europe union [8-9].

Herbs have been used for some disease since long time ago because of availability, easy usage. Many herbs have a long history of use even prehistoric use, in preventing or treating human and animal diseases. Aromatic plants have been used traditionally in therapy of some diseases worldwide for a long time. Research on the use of herbal mixtures in birds diets has produced inconsistent results [10]. Some authors state significant positive effects on performance [11-13], whereas another group of authors established no influence on gain, feed intake or feed conversion [12,14]. There are a lot of reports indicating the positive effects of herbs like anti-coccidal , anti-oxidant, anti-fungi and etc. Some of medical effects of herbs are related to their secondary metabolites such as phenols, necessary oils, saponins and etc [15]. The objective of this study was to investigate the interaction effects of supplementation of probiotic (*L. acidophilus* and *L. casei*) and Cuminum cyminum on the performance and blood chemistry of broiler chickens under commercial conditions.

Table1. Ingredients and chemical analyses composition of the starter and grower diets

Ingredients (g/kg)	**1-28**	**29-42**
Maize	557	300
Wheat	--	330
Soybean meal	370	300
Soybean oil	30	40
Fish meal	20	--
Limestone	10	--
Oyster shell	--	12
Dicalcium phosphate	5	15
Vitamin-mineral mix[2]	5	5
dl-methionine	1	1
Sodium chloride	2	2
Vitamin E (mg/kg)	--	100
Zn	--	50
Analyzed chemical composition (g/kg)		
Dry matter	892.2	893.5
Crude protein	222.3	200.7
Fat	62.4	62.9
Fiber	36.1	35.6
Ash	61.7	57.0
Calcium	8.22	8.15
Phosphorus	5.48	5.57
Selenium (mg/kg)	0.53	0.58
ME by calculation (MJ/kg)	12.78	12.91

Provides per kilogram of diet: vitamin A, 9,000 IU; vitamin D3, 2,000, IU; vitamin E, 18 IU; vitamin B1, 1.8 mg; vitamin B2, 6.6 mg B2,; vitamin B3, 10 mg; vitamin B5, 30 mg; vitamin B6, 3.0 mg; vitamin B9, 1 mg; vitamin B12, 1.5 mg; vitamin K3, 2 mg; vitamin H2, 0.01 mg; folic acid, 0.21 mg; nicotinic acid, 0.65 mg; biotin, 0.14 mg; choline chloride, 500 mg; Fe, 50 mg; Mn, 100 mg; Cu, 10 mg; Zn, 85 mg; I, 1 mg; Se, 0.2 mg.

MATERIALS AND METHODS

A total of 400 one day- old male Ross-308 broiler chicks were allocated into 4 dietary treatments and 5 repetitions with 20 chickens in each group, including P1) basal diet with no supplement as control group P2) basal diet containing 1% probiotic(*L. acidophilus* and *L. casei).* P3) received 2% Cuminum cyminum P4) Basal diet with 1% probiotic and 2% probiotic.During days 1-42, unbound water and dietary was in poultries' access. Dietary and chick weigh were going on weekly. Feed consumed was recorded daily, the uneaten discarded, and feed conversion ratio (FCR) was calculated (total feed : total gain). At the end of experiment, some analyses was done via SAS (Statistical Analyses Software) in the statistical level of 5% according to data gathered from dietary, average of FCR, weight of rearing period and carcass yield.

On 42 day of experimental period, 3 ml of blood was collected from brachial vein from one bird of each penpen (from four birds of eachtreatment). Serum was isolated by centrifugation at 3,000×g for 10 min.The serum concentrations of total triglyceride, cholesterol, highdensity lipoprotein (HDL) cholesterol and low-density lipoprotein (LDL) ratio in serum samples were analyzedby an automatic biochemical analyzer (Clima, Ral. Co, Espain).

RESULTS AND DISCUSSION

Table 1 summarises the performance of the broiler chickens, the best result of the live weight and FCR of the treated groups was in P4 ($P<0.05$), but the highest feed intake was in group 3. The result showed that both the treatments have better final result in compare with control treatment. In an experiment the addition 2% of cuminum cyminum to broiler diet led to increase their body weight. Increase in these parameters with the cuminum could have been due to its antibacterial and antifungal effects which can lead to decrease in the amount harmful microbes of digestive system, improve their immunity and performance[16].

Table 3 shows the effect of treatments on carcass and it's parameters. As compared to the control group with the other groups observably to give improve performance in all of the experimental ($P<0.05$). The highest percent of liver and breast was observed in experimental group 4 and the highest percent of gizzard and lowest percent of abdominal fat were in experimental groups 2. This is possible that it is result of synergetic influence of effective substances in increasing antimicrobial activity. There is a possibility of gathering these to antimicrobial herbs made a remarkable decrease in the amount of intestine microbial colony and this prevented from lysis of amino acids and they used in formation of proteinic tissues and increased the breast percentage. The present of antioxidants and phenolic substance in liquorice root may be the main cause of improvement in breast percent of broilers carcass. The presence of harmful bacterial populations in the gastrointestinal tract may cause breakdown of amino acids and thereby reduce their absorption as antimicrobial substances are present in liquorice root can reduce the harmful bacterial populations in the gastrointestinal tract and improve the levels of absorbed amino acids [17-18].

The results of this study were expected about feed probiotic conversion ratio in control group. Endens *et al*. [19] reported that probiotics improved digestion, absorption and availability of nutrition accompanying with a positive effect on intestine activity and increasing digestive enzymes. Jin *et a*l [20] reported that in low levels of *Lactobacillus* culture (0.05, 0.01%), feed intake rate have been increased, while Timmerman et al.[21] found inconsistent results, maybe because of type of diet ingredients which can affects probiotic's growth or their metabolites.

The mean values of serum constituents in broiler chicken fed different supplemented diets are shown in table 3. According to the results, total cholesterol (Chol), triglyceride (TG), HDL, LDL and Glucose were measured in blood samples of day 42. The amount of total Cholesterol, triglyceride (TG), LDL and HDL in the serum showed significant differences, but glucose was not significantly different among groups. There are many reports that are in agreement with presented results in the current study. *L. acidophilus* is capable to deconjucate glycocholic and taurocholic acids under anaerobic condition. Deconjucation of gallbladder acids in small intestine can affects control of serum cholesterol, while deconjucated acids are not capable to solve and absorb fatty acids as conjucated acids.As a consequence,they prevent from absorption of cholesterol. Also free gallbladder acids attach to bacteria and fibres and this can increase the excretion of them [22].

Table 2: Effects of treatments on performance of broilers.(1-42 day)

Treatment	Weight gain (gram/day)	Feed Intake (gram/day)	FCR
P1	37.86 ^{a}	78.13 ^{a}	1.86 ^{a}
P2	39.58^{ab}	79.69^{ab}	1.71^{ab}
P3	39.27 ^{ab}	80.16^{ab}	1.80 ^{a}
P4	39.97^{ab}	80.03^{ab}	1.72^{ab}
SEM	1.02	1.97	0.09

a-b Means with different subscripts in the same column differ significantly (P < 0.05)

Table 3. The effect of different levels of treatments on carcass traits of broilers

Parameters	P1	P2	P3	P4	SEM
Abdominal Fat	3.88^{a}	3.04^{ab}	3.75	3.15^{ab}	0.31
Gizzard	3.29^{a}	3.96^{ab}	3.91^{ab}	3.78^{ab}	0.45
Breast	32.08^{a}	33.56^{ab}	32.98^{a}	33.72^{ab}	0.26
Thigh	26.65^{a}	27.69^{ab}	27.68^{ab}	27.46^{ab}	1.46
Liver	3.12^{a}	3.83^{ab}	3.31^{a}	3.99^{ab}	0.30

a-b Means with different subscripts in the same column differ significantly (P < 0.05)

Table 4. The effect of different levels of treatments on blood biochemical of broilers

	Treatments				
Blood Parameters	P1	P2	P3	P4	SEM
Glucose (mg/dl)	171.36	171.15	171.35	172.65	4.34
Cholesterol (mg/dl)	135.65^{a}	131.19^{ab}	131.55^{ab}	130.32^{ab}	3.09
Triglyceride (mg/dl)	41.19^{a}	38.19^{ab}	40.61^{a}	38.01	1.61
LDL	32.10^{a}	30.32^{ab}	30.78^{ab}	30.21^{ab}	1.53
HDL	78.55	79.29	78.39	75.31^{ab}	2.21

a-b Means with different subscripts in the same column differ significantly (P < 0.05)

REFERENCES

[1]Mansoub, N.H, **2010**. *Global Veterinaria* 5 (3): 184-186, 2010
[2]Tekeli A., L.Çelik, H.R. Kutlu.and M. Gorgulu, **2006** Effect of dietary supplemental plant extracts on performance, carcass characteristics, digestive system development, intestinal

microflora and some blood parameters of broiler chicks; XII European Poultry Conference, Italy, 10 – 14 Sept.
[3] PARKER, R.B. **1974**. *Animal Nutrition Health* 29: 4-8.
[4] JERNINGEN, M.A. and RD. MILES. **1985**. *Poultry Science* 60: 99-107.
[5] TORTUERO, F. **1973**. *Poultry Science* 52: 197-203.
[6] DILWORTH, B.C. and EJ. DAY. **1978**. *Poultry Science* 57: 1101.
[7] ADLER, H.E. and AJ. DamASSA. **1980**. *Avian Diseases* 24: 868-878.
[8]Panda, A. K., M. R. Reddy, S. V. Ramarao, and N. K. Praharaj. **2003**. *Tropical Animal health and production.*32 (2): 85-94.
[9] Timmerman. H. M., A. Veldman, E. van den Elsen, F. M. Rombouts, and A. C. Beynen. **2006**. *Poultry Science* 85:1383–1388.
[10] Fritz Z, Schleicher A, Kinal S .**1993**. *J. Anim. Feed Sci*. 2: 189–195.
[11] Ertas O.N, Guler T, Çiftci M, Dalkilic B, Simsek Ü.G .**2005**. *In. J. Poult. Sci*. 4: 879-884.
[12] Cross D.E, Mcdevitt R. M, Hillman K, Acamovic T .**2007**. *Br. Poult. Sci*. 48: 496-506.
[13] Peric L, Milosvic N, Đukic-Stojcic M, Bledov S .**2008**. Effect of phytogenic products on performance of broiler chicken, World Nutrition Forum, Mayrhofen, Austria: Nottingham University Press, 18-20, 325.
[14] Ocak N, Erenter G, Burak A.K.F, Sungue M, Altop A, Ozmen A .**2008**. *Czech. J. Anim. Sci.* 53: 169-175.
[15]Fritz Z, Schleicher A, Kinal S .**1993**. *J. Anim. Feed Sci*. 2: 189–195.
[16] Mansoub NH (**2011b**). *Annals of Biological Research*, 2(3): 373-378.
[17] Lee, K.W., Everts, H. and Beyen, A.C. **2003**. *Journal of Applied Poultry Research*. 12:394-399.
[18] Gülçin I, Küfrevioğlu K, Oktay M, Büyükokuroğlu M.E (**2004**). *J. Ethnopharacology* . 90: 205-215.
[19]Endens, F., **2003**. *Rev. Bras. Cienc. Avic*., 5: 44-51.
[20] Jin. L. Z., Ho. Y. M., Abdullah. and N, Jalaludin. S. **1998**. *Poultry Science*; 77:1259-1265.
[21] Timmerman. H. M., A. Veldman, E. van den Elsen, F. M. Rombouts, and A. C. Beynen. **2006**. *Poultry Science* 85:1383–1388
[22] Corcoran, B., C. Stanton, G. Fitzgerald and R. Ross, **2005**. *Appl. Environ. Microbiol*. Vol: 71: 3060-3067.