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Echinacea purpura and Carumcopticum extract improve performance, carcass quality but not effect on blood parameters and Immune System in broiler chicken

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ABSTRACT

The research was conducted to examine the effects of supplementation dietary Echinacea purpura and Carumcopticum extract medicinal plant on performance, blood biochemical and immunity parameters of broiler chickens.240Ross broilers (one days of age) were used. The broiler were randomly allocated to 4 groups in 12 pens containing 20 birds each and assigned to receive one of 4 dietary treatments for 42 days (P1, First group as control group did not receive any herbal planet oil, P2, 200 ppm of Echinacea purpura extract, P3, 200 ppm Carumcopticum extract, P4, 200 ppm of both herbal planets oil.). The lowest and the highest feed conversion rates were respectively related to Echinacea purpura and control group(P< 0.05).The highest amount of daily feed intake was observed in the group4 and the lowest group was observed in control group also Carcass yield in 4 and 2 groups was significantly (P<0.05)higher than in P1. Significantly (P<0.05) higher breast percentage in group 4and the lowest percentage of abdominal fat was in the 3 group. The results showed that using Echinacea purpura and Carumcopticum extract in their diet had significant effects on performance, carcass traits(p>0.05) but there is no effect on blood biochemical parameters and immune system of broiler chickens (p>0.05).

Keywords: Broilers, Carcass traits, Echinacea purpura, Carumcopticum.

INTRODUCTION

Nutrients from plants by products are perhaps the most naturally abundant and the cheapest potential source of feeds. Natural resources are available for the synthesis and polymerization of glucose into less mobile forms and stored such as in plant.The antimicrobial activity of essential oils derived fromspices and herbs [1-2] is of interest as these oils could be used asfeed additives alternative to antibiotics [3] The positive effect of herbal plants on broilers have been reported by many studies. Their antibacterial potential, hypocholestrolemic effects, growth promoting and availability are the most beneficial part of herbs, which have drawn the scientists attention themselves[4].There is need to find more efficient alternatives or combinations ofdifferent

alternatives for maintaining health and improving performance of poultryand other livestock species. Phytogenic compounds are the groups of feed additivesthat have been reported to possess a potential for growth enhancement of livestockspecies due to presence of a number of pharmacologically active substances. Theyare supposed to enhance feed intake, activate digestive enzymes and stimulateimmune function [5]. 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, saponinsand etc.Aromatic plants and essential oil extracted fromthese plants have been used as alternatives toantibiotics. For this reason, these plants are becomingmore important due to their antimicrobial effects andthe stimulating effect on animal digestive system[6].Beneficial effects ofherbal extracts or active substances in animalnutrition may include the stimulation ofappetite and feed intake, the improvement ofendogenous digestive enzyme secretion,activation of immune response andantibacterial, antiviral, antioxidant andantihelminthic actions. Isoprene derivatives,flavonoids, glucosinolates and other plantmetabolites may affect the physiological andchemical function of the digestive tract. Thestabilizing effect on intestinal microflora maybe associated with intermediate nutrientmetabolism [7-8]

MATERIALS AND METHODS

240 Ross broilers (one days of age) were used. The broiler were randomly allocated to 4 groups in 12 pens containing 20 birds each and assigned to receive one of 4 dietary treatments for 42 days (P1, First group as control group did not receive any herbal planet oil, P2, 200 ppm of Echinacea purpura extract, P3, 200 ppm Carumcopticum extract, P4, 200 ppm of both herbal planets oil.).During days 0-42, 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, weight improvement, average of FCR, weight of rearing period and carcass yield.At 42 days of age, four birds per replicate were randomly chosen, slaughtered and carcass percent to live weight and percent of carcass parts to carcass weight were calculated.

In the 35^{th} day of experiment, three chicks were chosen from each group and inoculated from brachial vien by 0.1 ml (5 %). Heterophils to Lymphocytes ratio were determined which had been obtained from barchial vein of three randomly chosen chicks from each group in the 42^{th} day of experiment.Blood samples were obtained from barchial vein and centrifuged in order to getting serum, after 12 hours of fasting in the 42^{th} day of experiment. In the 35^{th} day of experiment, three chicks were chosen from each group and inoculated from brachial vien by 0.1 ml (5 %). Heterophils to Lymphocytes ratio were determined which had been obtained from barchial vein of three randomly chosen chicks from each group in the 42^{th} day of experiment.

RESULTS AND DISCUSSION

For the period of 0-42 days, The lowest and the highest feed conversion rates were respectively related to Echinacea purpura and control group($P< 0.05$). The highest amount of daily feed intake was observed in the group 4 and the lowest group was observed in control group(Table 2).

Table 3 shows the effect of plants and their different combinations on carcass and it's parameters. According to the data, there are significant differences in the carcass characters ($p<0.05$). The lowest percentage of abdominal fat was in the 3 group and the highest percentage

of breast was in the 4 group. There is an evidence tosuggest that herbs, spices and various plant extractshave appetite and digestion stimulating properties andantimicrobial effects [8]. These results agreewith the work of Lee *et al*. [9], who found thatadding the herbal planet to the diet of broilers improvedtheir growth performance.Aromatic plants and essential oil extracted fromthese plants have been used as alternatives toantibiotics. For this reason, these plants are becomingmore important due to their antimicrobial effects andthe stimulating effect on animal digestive system[6].They are reported to stimulate secretion of digestive enzymes (lipase andamylase) and intestinal mucous in broilers, to stimulate feed digestion, to impairadhesion of pathogens and to stabilize microbial balance in the gut [5]. However, effects of phytogenic compounds and their active ingredientsare not always observed in terms of performance parameters, as they also affectdifferent metabolic pathways and activity of different body systems.Case et al. [11] reported that dietary carvacroland thymol, at 150 ppm, did not influence BWgain of cockerels with initial weights of 126 gthat were followed during a 21-d feeding trial. Ina previous experiment with female broilers, Leeet al. [5] also found a lack of effect of herbal planet on growth performance and digestive enzyme activitywhen fed at a level of 100 ppm for a periodof 6 wk. It was suggested that the antimicrobialactivity of thymol may be masked by diet compositionand/or environment, in that no effect ofthymol on growth performance was seen whena well-balanced diet was fed and the birds werekept in a clean environment, as was done inthis study.The effects of Echinacea purpura and Carumcopticum extracton blood biochemical parameters are presented in Table 4.there is no effect on blood biochemical parameters and immune system of broiler chickens.

Table 1. 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

[1] starter diet fed to birds from 0 to 21 days.[2]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.

Table 2: Effect of different combinations ofherbal plants on performance of broiler chickens.

Treatment	Feed conversion ratio (g:g)	food Intake (g)	Body weight gain (g)
P1	1/80±0/ 52[b]	80/35±2/17[b]	45/02±1/49[b]
P2	1/63±0/[ab]36	82/56±1/[ab]96	46/86±1/68[b]
P3	1/68±0/[ab]15	81/02±1/[b]02	45/23±1/[b]32
P4	1/66±0/[ab]16	82/67±2/[ab]09	46/98±2/06[ab]

a-b: in each column the numbers which have different letters have significant differences (p<0.05).

Table3:Effect of different combinations of Treatments on quality of broiler chicken's carcass

P4	P3	P2	P1	Characters (%)
3/20± 0/25[ab]	3/15±0/21[ab]	3/45±0/31 [a]	3/86± 0/11 [a]	**Abdominal Fat**
3/05±0/13[ab]	2/33±0/02 [a]	2/33±0/21[a]	2/30± 0/52[a]	**Gizzard**
33/03±0/23[ab]	31/97±0/45[a]	32/68±0/71[ab]	31/06±0/64	**Breast**
28/24±0/45	28/23±0/42	28/35±0/40	28/19±0/10	**Lap**
3/52±0/50[a]	3/460/24	3/52±0/42	3/54±0/34	**Liver**

a-b: in each column the numbers which have different letters have significant differences (p<0.05).

Table 4: Effect of different combinations of herbal plants on blood biochemical and immune system parameters of broiler chickens

Parameters	P1	P2	P3	P4	SEM
Heterophils to Lymphocytes ratio	0.21	0.22	0.23	0.21	0.03
Globulin	1.38	1.35	1.31	1.35	0.16
Albumin	1.40	1.49	1.51	1.42	0.20

[a-c]*Means with different subscripts in the same row differ significantly (P < 0.05)*

Table 5. The effect of different levels of herbal plants on blood biochemical of hens

	Treatments				
Blood Parameter	P1	P2	P3	P4	SEM
Glucose (mg/dl)	172.09	170.23	171.48	172.13	2.99
Cholesterol (mg/dl)	135.21	135.65	135.06	136.01	3.29
Triglyceride (mg/dl)	41.98	41.32	40.52	40.34	1.53
LDL	33.54	33.98	34.53	32.11	2.01
HDL	82.98	82.81	83.12	82.53	1.32

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

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