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INFLUENCE OF USING SOME MEDICINAL PLANTS AS FEED ADDITIVES ON THE PERFORMANCE, CARCASS CHARACTERISTICS, AND BLOOD CONSTITUENTS OF GROWN MALE GIMMIZAH CHICKENS

1. THE USE OF ROSEMARY LEAVES (*ROSMARINUS OFFICINALS L.*)

By

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Abstract: *An experiment was conducted to study the impacts of two levels of rosemary leaves (RL), as an alternative for a growth-promoting probiotic (Moreyeast) on performance of male Gimmizah local strain, carcass quality, blood constituents, and digestibility of nutrients. Eighty four, 2-weeks old male Gimmizah chicks were divided randomly into 4 treatment groups with 21 chicks in each group which allotted into three replicates (7 each). The basal diets were supplemented with the following: 0.1 % rosemary leaves (RL), 0.2 % RL, probiotic (Moreyeast) 1 g/Kg diet or without supplementation (served as control). Results obtained indicated that, the addition of RL at level 0.1% and 0.2% to the diet significantly increased BW and BWG of Gimmizah chickens at 8 and 16 wks of age, 8-16 and 2-16 respectively. Improved feed conversion ratio during the periods 8-16 and 2-16 wks of age compared to probiotic or control groups. Supplementation RL at any levels as compared to probiotic and control groups decreased significantly serum concentration of total proteins, albumin, globulin and total cholesterol. The results showed improvement in immune response by supplementation of RL. The greatest reduction in aerobic plate counts, total coliform counts and total anaerobic counts was observed with the group fed diet containing the RL at levels 0.1 and 0.2% respectively. Probiotic significantly decreased concentrations of serum leptin hormone as compared to others treatment groups at 8 wks of age, while supplementation of 0.1% RL significantly decreased leptin hormone concentration at 16 wks of age.*

leptin hormone as compared to others treatment groups at 8 wks of age, while supplementation of 0.1% RL significantly decreased leptin hormone concentration at 16 wks of age.

INTRODUCTION

Herbs and spices by definition are flowering agents. (Linda, *et al.*, 2006). Most herbs and spices contain various chemicals as part of their intercellular composition, and these chemicals have the ability to help animals to stay healthy when fed as dietary component. Also, they may be extended the longevity of animal products when spread over (Dickens *et al.*, 2000 and HeeJeong *et al.*, 2001). This may be due to the ability of these plants to produce chemicals that protect them from insects, fungi, bacteria and viruses.

These herbs are considered to play an important role in strengthening the animal defense system by improving the physical conditions of gut ecosystem and enhancing functions of the immune system of chickens. (Guo, 2003).

Rosemary (*Rosmarinus officinalis* L.), family Lamiaceae, is a dense, evergreen, hardy, perennial aromatic herb of 90–200 cm height with small (2–4 cm) pointed, sticky and hairy leaves.

The composition of rosemary oil is 1,8-cineol (30–40%), camphor (15–25%), borneol (16– 20%), bornyl acetate (up to 7%), α-pinene (25%) as well as β-pinene, linalool, camphene, subinene, myrcene, α -phellandrene, α -terpinene, limonene, *p*-cymene, terpinolene, thujene, copalene, terpinen-4-ol, α-terpineol, caryophyllene, methyl chavicol, thymol, etc. The initial distillation fraction contains mostly α-thujene, α-pinene, camphene, β-pinene and 1,8-cineol, while camphor and bornyl acetate constitute the bulk of the later distillation (Prakasa Rao *et al.*, 1999).

Singletary and Rokusek (1997) reported that, rosemary extract improved broiler performance and feed conversion efficiency as compared to broiler chicks fed diet without such herb.

Radwan (2003) illustrated that broiler chicks fed diet containing 0.5 % rosemary leaves exhibited higher live body weight and body weight gain, better feed utilization allover the experimental period from 7-49 days of age and showed higher percentage of carcass and lowered abdominal fat as compared to control.

Florou-Paneri *et al.*, (2006) found that, the incorporation of rosemary in the broiler chickens diets led to a slight decrease in the formation of

malondialdehyde in the meat samples compared to the control. However, rosemary was more effective in retarding lipid oxidation in both raw and cooked meat samples.

The present experiment was conducted to study the impacts of two levels of rosemary leaves (RL) (*Rosmarinus officinals* L.), as an alternative for a growth-promoting probiotic (Moreyeast) on performance of male Gimmizah local strain, carcass quality, blood constituents, and digestibility of nutrients as a mean of using the natural products as growth promoting agents.

MATERIAL AND METHODS

The present study was carried out at El-Sabahia Poultry Research Station in Alexandria, Animal Production Research Institute, Agricultural Research Center, Ministry of Agriculture. During January and October 2006. Eighty four, 2-weeks old male Gimmizah chicks were wing-banded, weighed and divided randomly into 4 treatment groups with 21 chicks in each group were divided into three replicates (each 7). All chicks were raised in battery brooder cage (100 x 50 x 50, cm) placed in a temperature-controlled room. The average initial body weights of treatment groups were nearly similar.

Experimental diets: Chicks in all experimental groups were fed a basal starter diet from 2-8 weeks of age and a basal grower diet from 8-16 weeks of age. Basal diets were supplemented with the following: 0.1 % rosemary leaves (RL), 0.2 % RL, probiotic [product of Norchem, USA (Moreyeast)] 1 g / Kg diet and control diet. (Table 1)

All experimental groups were reared under similar management and hygienic conditions. Fresh water was automatically available at all time Experimental diets were offered to chicks *ad libitum* in mash form.

Body weight (BW) and feed intake (FI) were recorded at two, eight weeks and at end of the experiment (16 weeks of age). Body weight gain (BWG) and feed conversion ratio (FCR) were calculated during the same periods.

A digestibility trial was conducted to test the effect of different types and levels of feed additives on apparent digestibility of nutrients e.g. crude protein (CP), ether extract (EE), crude fiber (CF), nitrogen free extract (NFE), dry matter (DM) and organic matter (OM) at 16 weeks of age, for all four experimental diets, then the estimation was made as following (Han *et al.*, 1976).

Slaughter traits: At the end of the experiment (16 weeks of age) chickens from each treatment were randomly selected, weighed and then

slaughtered for carcass evaluation. Carcass, giblets (liver, heart, and empty gizzard), spleen, empty intestine, cecum and testes were weighed and expressed as a percentage of live body weight.

Blood samples and analyses: At the end of the experiment, blood samples from three birds of each treatment were collected. Serum was separated for determination the count of red blood cells (RBCs) (Pappas *et al*., 1992), White blood cells counts: (Miller and Seward, 1971), determination of hemoglobin (Hb) Turpini and Lorenzo, (1966) and packed cell volume (PCV) were performed according to Schalm (1986) and guidelines of Dacie (1984) by microhaematocrit tubes.

Differential leucocytic count: Blood film was prepared according to the method described by Lucky (1977). The percentage and absolute value for each type of cells were calculated according to Schalm (1986).

Blood biochemical characteristics: Serum total protein (g/dl) was measured by the Biuret method as described by Armstrong and Carr (1964), albumin concentration (g/dl) was determined according to Doumas *et al.*, (1977) and serum globulin (g/dl) was calculated by the difference between serum total protein and albumin, since the fibrinogen usually comprises a negligible fraction (Sturkie, 1986). Total cholesterol (mg/dl) was determined according to the method of Watson (1960).

Alanine transaminase (ALT) and Aspartate transaminase (AST) determinations were done according to the method outlined by Reitman and Frankel (1957).

Microbiological Study: Intestine samples were collected and examined to define and count the aerobic and anaerobic microflora. Aerobic plate count (APC), total coliform count and total anaerobic count were carried out according to American Public Health Association (A.P.H.A) (1985). Serial ten fold dilutions were done on standard plate count agar, Bacto MacConkeys's broth (Difco) and anaerobic agar medium respectively.

Serum leptin hormone determination: Serum leptin hormone (mg/ml) were analyzed using radioummunoassay (RIA) kits manufactured by Diagnostic systems laboratories USA by Automatic 1275 MiniGamma Counter LKB according to the method described by Miller (1996).

The statistical analysis of the experimental data was computed using analysis of variance procedure described in **SAS (1990)**. The significant mean differences among treatment means were separated by Duncan's Multiple Range test (Duncan, 1955).

RESULTS AND DISCUSSIONS

Body weight: Statistical analysis (Table 2) showed no significant differences in Gimmizah chick's body weight at two weeks of age, which means there was a random distribution of the birds on the different treatments. Concerning the effect of rosemary leaves (RL) on body weight, the addition of RL at level of 0.1 % and 0.2% to the diet significantly increased BW by 6.49, 9.04% and 9.19, 11.75% at 8 and 16 wks of age, respectively, as compared with the control. However chicks fed probiotic (Moreyeast) had insignificant differences of BW as compared to those fed different levels of RL or control groups at 8 wks of age. On the other hand at 16 wks of age chicks fed probiotic statistically equal with those fed RL at 0.1 and 0.2% supplementation, while it's BW significantly increase by 10.17% as compared to control.

Body weight gain: supplementation of 0.1 and 0.2% RL significantly increase Gimmizah males BWG by 12.01 and 12.76% as compared to control group during the periods 2-8 wks of age. While, BWG of males fed probiotic supplementation in these diet statistically equal with control and those fed RL at any levels during 2-8 weeks of age. On the other hand supplementation of 0.1 and 0.2% RL or probiotic significantly increase BWG of Gimmizah chickens by 13.29, 16.92, 17.72 and 10.51, 13.81, 11.87% during the periods of 8-16 and 2-16 wks of age, respectively. (Table 3)

In this respect, Radwan (2003) reported that the use of 0.5 % RL in the diets of broiler chicks increased body weight and body weight gain of chicks throughout the experimental period. Also, the same results were observed by Lopez-Bore *et al.*, (1998).

Feed Intake and feed conversion: The results of feed intake (Table 4,5) during the first periods 2-8 wks of age indicated insignificant differences among these treated groups. While, during the periods 8-16 and 2-16 wks of age males fed RL at any levels (0.1 and 0.2%) significantly decrease FI as compared to these fed probiotic or control groups. On the other hand FI of these bird fed probiotic statistically equal with those fed control diet. Data of FC had the same trend of feed intake, since the addition of RL significantly improved FC during the periods 8-16 and 2-16 wks of ages compared to those fed probiotic or control groups. (Table 5)

Abdo *et al.*, (2003) showed that 1.5 or 3% supplemented level of hot pepper to broiler diets insignificantly decreased feed consumption from 1 to 3, 3 to 6 and 1 to 6 weeks of age. However, Al-Ghamdy (2004) showed that addition of hot pepper at level of 2.0kg/ton diet had no significant effect on feed intake of broilers throughout the experimental periods. El-Deeb *et al.* (2006)

found that capsicum at 150 mg/kg diet did not affect feed consumption of broiler chicks.

Concerning the effect of probiotic supplementation, the data obtained by Zeweil and Ismail (1998) indicated that feed consumption was not affected by the addition of probiotic. In contrast, Ibrahim and Mobarak (2004) reported that Fayoumi chicks which received diets supplemented with Yea-Sacc showed significant reduction in the total amount of feed consumed as compared to the control.

The improvements in body weight gain or feed conversion ratio due to feeding medicinal plants could be attributed to their antimicrobial, antioxidant and improving nutrient utilization due to the presence of phenolic diterpenes, flavonoids and phenolic acids (El-Husseiny *et al.*, 2002, Genedy and Zeweil, 2003).

Nutrient digestibility: digestibility values of DM, CP, NFE and OM were insignificant affected by different feed additives supplementation as compared to control. (Table 6). Significant increases of EE and CF digestibility value for the bird fed RL at 0.2% supplementation by 16.04 and 12.14%, respectively as compared to control group.

The improvement of nutrients digestibility by supplementing chick diets with medicinal plants or probiotic could be attributed to different stimulators such as change in the enteric flora and reduction of *E.coli* population, lowering gastric pH, synthesis of catabolic enzymes of favorable microorganisms that help in releasing cell compounds including amino acids, sugar and fatty acids into the intestinal environment and involving of active bacteria with the digestive processes and nutrient absorption in gastrointestinal tract (Wenk, 2002). In this regard, Tekeli *et al.* (2006) found that plant extracts e.g. 120 mg essential oils of *Oreganum vulgare* or *Zingiber Officinale* reduced the total length of digestive tract, but increased weight of jejunum, with increasing the number of lactic acid bacteria in jejunum. Also, El-Deeb *et al.* (2006) found that botanical extract (garlic, anise, cinnamon, rosemary and thyme) decreased intestinal absorption of lipids, and total microbial count of cecum.

Radwan (2003) found that feeding broiler chicks at 28 and 49 days of age on diets supplemented with 0.25 or 0.5 % CF or 0.5 % RL improved digestibility of most nutrients, except the ether extract which was decreased without affecting the metabolizable energy values comparing to control.

Carcass traits: Rosemary leaves (RL) and probiotic supplementation significantly increases carcass and tests percentages as compared to control

(Table 7). Also, supplementation of 0.1% RL increased significantly pancreas percentage while 0.1% and 0.2% RL supplementation increased significantly spleen percentages as compared to control. On the other hand supplementation of 0.2% RL and probiotic significantly decrease intestinal length and weight percentage, as compared to control. While, the liver and edible percentage were insignificantly different among whole treatments.

Henry *et al.* (1986) stated that the decrease in intestinal tract weight was a result of thinning of intestinal wall. The study of Stutz *et al.* (1983) and Zeweil *et al.* (1989) revealed that antibiotics can eliminate undesirable microorganisms that produce toxins or metabolic products that irritate and increase thickness of intestinal wall and subsequently decrease the absorption of nutrients. Similar results were reported by El-Deeb *et al.* (2006) and Tekeli *et al.* (2006).

These results supported the present findings. However, different mode of action may be involved between different medicinal plants.

Hematological parameters: The results showed that HB concentration and RBC count where not affected by either RL or probiotic supplementation as compared to control group. (Table 8). Supplementation of RL or probiotic to Gimmizah chicks significantly decrease PCV% as compared to control. Supplementation of 0.1% RL or probiotic significantly increase WBCs count as compared to control group or those fed 0.2% RL supplementation

Differential leucocytic counts Lymphocytes: Results indicated that there were insignificant differences in lymphocytes due to different treatments as compared to control. (Table 9). Monocytes counts was significnatly decrease by supplementation of RL or probiotic as comapred to control. Basophilus counts was significnatly decrease by supplementation of RL at 0.1% level as comapred to the other supplementation or control groups. The RL-supplemented-diet at 0.2 % level resulted signficnatly highest values of eosinophils as compared to the other experimental groups. Birds fed diets containing 0.1 % RL, and probiotic significantly increased its neutrophils as compared to control group. The highest neutrophils count were observed in the group fed 0.1 % RL and the lowest value was from 0.2 % R.L supplemented-group.

In general, there is a scarce of literature data regarding the effect of medicinal plants and probiotic supplementation on lymphocytes, monocytes, basophils, eosinophils and neutrophils counts. However, Osman and El-Barody (1999) reported that supplementation of medicinal plants to broiler chick diets has slightly significant effect on immune response, in which the

lymphocyte, heterophil, basophil and eosinophil percentages increased gradually with increasing the level of medicinal plants in the diet. On the other hand, Schleicher *et al.*, (1998) found that the addition of 1.5 % *Matricaria chamomilla* in broiler diets increased leukocyte count in chicken's blood. Moreover, Kolacz *et al.*, (1997) reported that chamomile flower contains a zulenes stimulating phagocytosis that may have been directly involved in immune reactivity.

Blood biochemical characteristics: Table (10,11) were illustrating the serum concentration of total proteins, albumin, globulin and total cholesterol decreased significantly by RL supplementation at any levels as compared to probiotic and control groups. While birds fed probiotic supplementation in these diet statistically equal with control group. Our results are in agreement with the results of Gohain and Sapcota (1998), Sherif (2001), and Kalavathy *et al.*, (2003) who reported that probiotic did not influence total serum protein. Also, El-Sheikh (2006) reported that total protein, albumin and globulin concentrations were not affected by probiotic supplementations in broiler diets. (Table 10)

The decrease in serum cholesterol reflects the hypocholesterolemic properties that could be attributed to the defatted part of RL.

Supplementation of RL at level 0.1% significantly decrease AST concentrations as compared to the other supplementation or control groups. While ALT concentration was not significantly affected by RL or probiotic supplementation. (Table 11)

In this respect, Radwan (2003) found that, serum cholesterol was significantly decreased due to supplementing diets with 0.5, 1.0 and 2.0 % RL. Also he found that, AST and ALT were not affected by RL supplementation up to 0.5%.

The results in this study demonstrated that the average values of blood parameters were almost within the normal range.

Daif Allah (2007) reported that cholesterol concentrations in the serum of broilers tended to decrease in the groups fed 1.5 or 3.0 g hot pepper, 3.0 g cumin and 1.5 or 3.0 g mixture (hot pepper + cumin) / Kg diet as compared to the control. Also, Tekeli *et al.* (2006) found that flavomycin and plant extracts did not significantly affect serum cholesterol, glucose and triglycerides.

Microbiological study: The results showed that, rosemary and probiotic reduced aerobic plate counts, total coliform counts and total

anaerobic counts. The greatest reduction was observed with the group fed diet containing the RL at levels (0.1 and 0.2 %). (Table 12). In general, the rosemary at any levels proved to have an antibacterial effect, where the intestines were free of total anaerobic counts, and also, aerobic plate counts and total coliform counts were the lowest in these groups as compared to the other experimental groups.

The improving in body weight gain and feed conversion ratio of male Gimmizah chicks could be attributed to the antibacterial activity of most medicinal plants and probiotic used in this study. Soliman *et al.,* (2003) reported that yeast and marjoram cleaned the gastrointestinal tract from *salmonella*. On the other hand, they observed that the count of *E coli* was decreased due to marjoram, bacitracin and yeast and a combination of yeast and bacitracin, however, marjoram at 1.5 g / Kg diet was the most effective. Similar results were observed by Cowan (1999). El-Deeb *et al.* (2006) and Tekeli *et al.* (2006) found that capsicum and botanical plant extracts decreased the total bacterial counts in caecum and total mesophile aerobic, coliform, while increased lactic acid bacteria in jejunum, respectively.

In conclusion, the results indicated that the impact of medicinal plants on microbial population in the intestine is supported by the present results.

Serum leptin hormone: Data presented in Table (13) showed the effect of rosemary levels and probiotic on concentrations of leptin hormone. Leptin is a peptide secreted from the adipose tissue that may play an important role in suppressing appetite in swine through actions at the hypothalamus (Barb *et al.,* 1998). Recent observations suggest that the cardiovascular actions of leptin may help explain the link between excess fat mass and cardiovascular diseases. Leptin is an adipocyte-derived hormone that acts in the central nervous system to promote weight loss by decreasing food intake and increasing metabolic rate.

The obtained results in this study showed that probiotic significantly decreased concentrations of leptin hormone as compared to others treatment groups at 8 wks of age. While at the end of experimental period (16 wks of age) supplementation of 0.1% RL significantly decrease leptin hormone concentrations than RL at 0.2% supplementation or control groups.

Table (1): Composition and calculated analysis of the basal experimental diets

Ingredients (%) \ Diets	Starter (0-8 wks)	Grower (8-16wks)
Yellow corn	64.00	63.00
Soybean meal (44% CP)	32.10	17.60
Wheat bran	------	15.68
Dicalcium phosphate	1.80	1.25
Limestone	1.40	1.80
DL-Methionine	0.10	0.07
NaCl	0.30	0.30
Vit.and mineral (premix)[1]	0.30	0.30
Total	100	100
Calculated analysis[2]		
Crude protein (%)	19.56	15.56
ME (Kcal/kg diet)	2860	2707
C/P ratio	146.2	174
Crude fat (%)	2.69	3.01
Crude fiber (%)	3.65	4.34
Calcium (%)	1.03	0.97
Phosphorus available (%)	0.47	0.39
Methionine (%)	0.41	0.33
Methionine + Cysteine (%)	0.74	0.54
Lysine (%)	1.03	0.73
Arginine (%)	1.25	0.95

[1]Three kg of vitamin- mineral premix per ton of feed supplied each kg of diet with Vit. A 12000 IU; Vit. D_3 2000 IU; Vit. E. 10mg; Vit. k_3 2mg; Vit.B_1 1mg; Vit. $B_2$4mg; Vit. B_6 1.5 mg; Pantothenic acid 10mg; Vit.B_{12} 0.01mg; Folic acid 1mg; Niacin 20mg; Biotin 0.05mg; Choline chloride (50% choline) 500 mg; Zn 55mg; Fe 30mg; I 1mg; Se 0.1mg; Mn 55mg; ethoxyquin 3000 mg.

[2] As recommendation of Anim. Prod. Res. Inst., Agric Res. Center, Minis of Agric.

Table (2): Effect of different experimental treatments on body weight (BW)[1] of growing male Gimmizah chicks

Age (Wk) / Treatments	Body weight (gm)		
	W2	W8	W16
Rosemary (0.1%)	179.05±3.43	830.86±26.24[a]	1690.53±41.85[a]
Rosemary (0.2%)	175.48±5.03	850.71±18.72[a]	1730.21±37.28[a]
Moreyeast	182.76±4.42	809.33±21.55[ab]	1705.75±49.31[a]
Control	184.33±3.17	780.19±26.47[b]	1548.25±36.06[b]
Sig.	NS	**	**

[1] Mean±SE ** Significant at ≤ 0.01 NS. Non significant
a,b; means with different letters in the same column differ significantly

Table (3): Effect of different experimental treatments on body weight gain[1] of growing male Gimmizah chicks

Age (Wk) / Treatments	Body weight gain (g)		
	2-8	8-16	2-16
Rosemary (0.1%)	661.81±12.13[a]	861.76±16.58[a]	1512.33±42.33[a]
Rosemary (0.2%)	666.23±18.90[a]	885.51±12.92[a]	1557.52±41.54[a]
Moreyeast	628.53±20.28[ab]	895.36±20.37[a]	1530.99±39.22[a]
Control	590.86±22.16[b]	760.61±15.33[b]	1368.52±34.43[b]
Sig.	*	*	*

[1] Mean±SE * Significant at ≤ 0.05
a,b; means with different letters in the same column differ significantly

Table (4): Effect of different experimental treatments on feed intake[1] (g/chick/day) for growing male Gimmizah chicks

Age (Wk) / Treatments	Feed Intake (g/chick/day)		
	2-8	8-16	2-16
Rosemary (0.1%)	80.71±10.32	100.04±20.23[b]	89.90±12.10[b]
Rosemary (0.2%)	75.18±11.31	108.65±9.38[b]	93.30±12.91[b]
Moreyeast	76.84±11.35	142.95±21.13[a]	115.31±11.22[a]
Control	78.24±12.25	134.15±22.71[a]	110.08±13.00[a]
Sig.	NS	*	*

[1] Mean±SE * Significant at ≤ 0.05 NS. Non significant
a,b,c; means with different letters in the same column differ significantly

Table (5): Effect of different experimental treatments on feed conversion ratio[1] for growing male Gimmizah chicks

Age (Wk) / Treatments	Feed conversion ratio		
	2-8	8-16	2-16
Rosemary (0.1%)	5.11±0.21^{ab}	6.39±0.20^{b}	5.82±0.30^{b}
Rosemary (0.2%)	4.89±0.32^{b}	6.70±0.25^{b}	5.87±0.41^{b}
Moreyeast	5.15±0.22^{ab}	8.94±0.31^{a}	7.39±0.46^{a}
Control	5.51±0.25^{a}	9.61±0.27^{a}	7.89±0.53^{a}
Sig.	*	*	*

[1] Mean±SE * Significant at ≤ 0.05

a,b,c; means with different letters in the same column differ significantly

Table (6): Effect of treatments on digestibility values[1] of DM, CP, EE, CF and NFE

Item / Trait	DM (%)	CP (%)	EE (%)	CF (%)	NFE (%)	OM (%)
Rosemary (0.1%)	71.75±1.72	86.40±0.66	66.84±3.01^{b}	30.13±1.63^{ab}	80.12±2.01	66.46±1.92
Rosemary (0.2%)	70.57±1.80	84.17±0.61	81.23±0.68^{a}	33.43±0.92^{a}	78.59±1.20	69.28±0.13
Moreyeast	71.24±0.92	87.72±0.39	66.65±0.92^{b}	31.55±1.00^{ab}	77.79±0.90	70.23±0.85
Control	70.73±0.97	83.75±0.61	70.00±0.52^{b}	29.81±0.75^{b}	77.71±0.87	68.11±0.40
Sig.	NS	NS	*	*	NS	NS

[1] Mean±SE * Significant at ≤ 0.05 NS. Non significant

a,b; means with different letters in the same column differ significantly.

Table (7): Effect of different experimental treatments on carcass traits of Gimmizah chicks[1]

Traits	Carcass traits %							
	Carcass	Pancreas (%)	Liver (%)	Spleen (%)	Tests (%)	Edible (%)	Intestinal length (cm)	Intestinal weight (%)
Rosemary (0.1%)	69.53 ±0.78^{a}	0.32 ±0.04^{a}	2.04 ±0.03	0.32 ±0.01^{a}	0.87 ±0.07^{a}	73.96 ±0.82	189.33 ±8.35^{a}	5.22 ±0.60^{a}
Rosemary (0.2%)	71.58 ±0.78^{a}	0.24 ±0.02^{b}	2.20 ±0.37	0.31 ±0.02^{a}	0.98 ±0.23^{a}	76.18 ±0.60	172.33 ±12.55^{b}	4.39 ±0.57^{b}
Moreyeast	68.59 ±0.73^{a}	0.24 ±0.03^{b}	2.23 ±0.37	0.21 ±0.01^{b}	0.90 ±0.22^{a}	73.24 ±0.80	175.00 ±14.43^{b}	4.70 ±0.31^{b}
Control	60.14 ±0.53^{b}	0.26 ±0.05^{b}	2.20 ±0.45	0.21 ±0.01^{b}	0.79 ±0.01^{b}	73.64 ±0.17	190.33 ±15.66^{a}	5.44 ±0.81^{a}
Sig.	*	*	NS	*	**	NS	**	**

[1] Mean±SE * Significant at ≤ 0.05 ** Significant at ≤ 0.01 NS. Non significant

a,b; means with different letters in the same column differ significantly

Table (8): Effect of treatments on blood hematology traits (Hg, PCV, RBC, and WBCs)

Items / Trait	Hg (%)	PCV (%)	RBC ($x10^3/mm^3$)	WBCs ($x10^3/mm^3$)
Rosemary (0.1%)	21.03±2.05	32.40±1.60^b	2.40±0.06	25.75±7.75^a
Rosemary (0.2%)	22.94±1.08	32.75±5.75^b	2.45±1.35	21.50±0.50^b
Moreyeast	20.74±1.13	33.05±0.25^b	2.35±0.25	23.50±5.50^a
Control	20.15±8.45	36.90±1.10^a	2.75±0.15	21.25±6.25^b
Sig.	NS	*	NS	**

[1] Mean±SE * Significant at ≤ 0.05 ** Significant at ≤ 0.01
a,b,c; means with different letters in the same column differ significantly

Table (9): Effect of treatments on WBCs differentiation

WBCs / Trait	WBCs ($x10^3/mm^3$)				
	Lymphocytes	Monocytes	Basophilus	Eosinophils	Neutrophils
Rosemary (0.1%)	48.88±1.05	2.06±0.31^b	8.93±0.90^b	8.94±0.61^b	30.52±1.20^a
Rosemary (0.2%)	50.88±1.21	2.56±0.42^b	9.85±0.81^a	10.74±0.91^a	26.02±1.19^b
Moreyeast	49.68±2.63	1.39±0.15^c	10.00±0.63^a	8.67±0.62^b	29.62±2.30^a
Control	49.48±2.72	3.31±0.16^a	9.43±0.41^a	9.11±0.46^b	28.62±3.01^{ab}
Sig.	NS	*	*	*	*

[1] Mean±SE * Significant at ≤ 0.05 ** Significant at ≤ 0.01
a,b,c,d,e; means with different letters in the same column differ significantly

Table (10): Effect of treatments on blood biochemical traits (total protein total albumin, total globulin and total cholesterol)

Items / Trait	Total Protein (g/dl)	Total Albumin (g/dl)	Total Globulin (g/dl)	Total Cholesterol (mg/dl)
Rosemary (0.1%)	5.9±0.3^b	2.9±0.7^b	3.0±0.4^b	86.60±1.1^b
Rosemary (0.2%)	5.6±0.1^b	2.7±0.2^b	2.9±0.2^b	80.57±0.7^b
Moreyeast	7.5±0.5^a	3.2±0.2^a	4.3±0.2^a	92.3±3.0^a
Control	7.8±0.8^a	3.3±0.3^a	4.5±0.4^a	99.4±4.69^a
Sig.	*	*	*	**

[1] Mean±SE * Significant at ≤ 0.05 ** Significant at ≤ 0.01
a,b,c; means with different letters in the same column differ significantly

Table (11): Effect of treatments on AST, ALT[1]

Items / Trait	AST	ALT
Rosemary (0.1%)	74.77±2.40[b]	7.80±0.07
Rosemary (0.2%)	86.71±1.00[a]	8.27±0.27
Moreyeast	86.21±0.60[a]	8.74±0.32
Control	83.85±1.68[a]	8.56±0.26
Sig.	*	NS

[1] Mean±SE * Significant at ≤ 0.05
a,b,c: means with different letters in the same column differ significantly
AST = Aspartate amino transaminase. ALT = Alanine amino transaminase.

Table (12): Count of aerobic and anaerobic bacteria in intestinal different treated groups

Type of bacteria / Trait	Aerobic plate count (APC)	Total coliform Count	Total anaerobic count
Rosemary (0.1%)	$14x10^3$	$25x10^3$	$8x10^3$
Rosemary (0.2%)	$13x10^2$	$28x10^4$	$3x10^2$
Moreyeast	$38x10^4$	$65x10^6$	$18x10^3$
Control	$39x10^5$	$72x10^7$	$19x10^3$

Table (13): Effect of treatments on serum leptin hormone[1]

Items / Trait	Leptin (8 wk)	Leptin (16wk)
Rosemary (0.1%)	0.180±0.09[a]	0.230±0.10[b]
Rosemary (0.2%)	0.172±0.01[a]	0.282±0.07[a]
Moreyeast	0.159±0.03[b]	0.271±0.02[ab]
Control	0.185±0.04[a]	0.301±0.06[a]
Sig.	*	*

[1] Mean±SE * Significant at ≤ 0.05
a,b: means with different letters in the same column differ significantly

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الملخص العربى

تأثير إستخدام بعض النباتات الطبية كإضافات غذائية على أداء و صفات الذبيحة و تركيب دم ذكور دجاج الجميزة

١. استخدام حصالبان كإضافة غذائية على أداء و صفات الذبيحة و تركيب دم ذكور دجاج الجميزة

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اجرى هذا البحث بهدف دراسة تأثير إضافة مستويين من حصالبان ٠.١% و ٠.٢% و مقارنتهم بمحفز النمو التجارى (Moreyeast) على أداء و صفات الذبيحة و تركيب دم ذكور دجاج الجميزة. تم استخدام ٨٤ ديك من سلالة الجميزة عمر اسبوعين و تم تقسيمهم الى ٤ مجاميع فى كل مجموعة ٢١ ديك. و تم اضافة المعاملات الى العليقة المقارنة.

اوضحت النتائج ما يلى:

- ان اضافة حصا اللبان ادى الى زيادة معنوية فى وزن الجسم و كذلك فى وزن الجسم المكتسب عند ٨ و ١٦ أسبوع من العمر. كذلك ادت الى تحسن فى الكفاءة التحويلية للعلف و ذلك مقارنة بالعليقة المضاف اليها محفز النمو التجارى و كذلك العليقة المقارنة.
- اضافة حصالبان الى العليقة المقارنة ادت الى انخفاض معنوى فى البروتين الكلى، الالبيومين، جلوبيولين و كوليستيرول الدم.
- اضافة حصالبان ادت الى انخفاض معنوى فى العد الميكروبى فى الامعاء.
- اضافة حصالبان ادى الى تحسن فى أداء ومناعة الطيور
- اضافة محفز النمو التجارى الى عليقة المقارنة ادى الى انخفاض فى هرمون الليبتين عند ٨ اسابيع من العمر بالمقارنة بباقى المعاملات. فى حين ان هذا الهرمون انخفض عند ١٦ أسبوع من العمر بإضافة حصالبان.

يستخلص من هذه الدراسة انه يمكن استخدام حصالبان كإضافة غذائية طبيعة محفزة للنمو بدلا من المحفزات المخلقة صناعيا.