Effect Of Adding Different Levels Of Echinacea Purpurea Extract On The Productive Performance Of Broiler Chickens

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ABSTRACT

The main objective of this study was to investigate the effect of Echinacea purpurea extract (EPE) on performance and health status of broilers from 1 to 42 d of age A total number of 180, one day-old broiler chicks(IR), were randomly divided into 4 equal treatments with 3 replicates of each (15 birds / replicate). Birds were allocated to the 4 Treatment: T1 (control positive), T2 (control negative), T3 (basal diet + Echinacea 0.5 ml/l) and T4 (basal diet + Echinacea 1.0 ml/l). Production indices were evaluated weekly at different periods of experiment. At the end of experiment (42 d), 10 birds per treatment were processed to determine the detailed of performance index carcass characteristics. . Also, blood samples were taken from each treatment alone to evaluate the health status and immune response. The results indicated that broilers treated with Echinacea purpurea Extract (1.0) m/L had the best performance ($P \leq 0.05$) in comparison with other groups. However, abdominal fat weight percentage recorded lower values for birds treated by EPE (1.0). In this context, lymphoid organs and immune response were better for broilers had treated by EPE (1.0) than other groups. It can be concluded that the supplementation EPE (1.0) schedule was more beneficial without any negative effect on growth performance or physiological status

Key words : Echinacea purpurea, broilers Productive performance, additive feed

الملخص

هنـاك القليـل مـن الابحـاث حـول تـأثير مسـتخلص الاخناسـيا بوربوريـا Ehinacea purpurea Extract (EPE) علـى أداء دجـاج التسـمين. لهـذا الغـرض ، كـان الهـدف الرئيسـي مـن هـذه الدراسـة هـو التحقـق مـن تـأثير مسـتخلص (Ehinacea purpurea (EPE علـى الأداء والحالـة الصـحية للـدجاج اللاحـم مـن 1 إلـى 42 يومًـا مـن العمـر ،تـم اسـتخدام سـلالة انـديان ريفـر (IR) وتـم تقسـيم الكتاكيـت عشـوائياً إلـى 4 معـاملات متسـاوية فـى كـل معاملـه 3 مكـررات لكـل منهـا (15 طـائر / مكـرره). المعاملـه الاولـى (الكنتـرول الموجـب) ، المعاملـه الثانيـه (الكنتـرول السـالب) ، المعاملـه الثالثـه (الكنتـرول السـالب + إشنسـا 0.5 مـل / لتـر) و المعاملـه الرابعـه (الكنتـرول السـالب + إشنسـا 1.0 مـل / لتـر) وتـم توفيرإضـاءه وعلـف ودرجـة حـراره ورطوبـه مناسـبه طـوال التجربـه . وتـم تقيـيم مؤشـرات الاداء الإنتـاجى أسـبوعيا فـي فتـرات مختلفـة مـن التجربـة حتـى نهايـة التجربـة (42) يـوم وفـى نهايـة التجربـه تـم اجـراء الـذبح لعـدد 10 طيـور مـن كـل معاملـة لتحديـد الخصـائص التفصـيلية لمؤشـر أداء الذبيحـة . كمـا تـم أخـذ عينـات دم مـن كـل معاملـه علـى حـدة لتقيـيم الحالـة الصـحية والاسـتجابة المناعيـة وأشـارت النتـائج إلـى أن دجـاج التسـمين المعامـل بمسـتخلص الاخناسـيا ((1.0 EPE مـل / لتـر كـان أفضـل أداء ($P \leq 0.05$) مقارنـة بالمجموعـات الأخـرى . أمـا النسـبة المئويـة لـوزن الـدهون فـي منطقـة الـبطن فقـد سـجلت قيمًـا أقـل للطيـور المعالجـة بـ 1.0) EPE)) مـل/ لتـر .فـي هـذا السـياق ، كانـت الأعضـاء اللمفاويـة والاسـتجابة المناعيـة أفضـل بالنسـبة للـدجاج التـي تـم اضـافة 1.0 EPE)) مـل /لتـر مـن المجموعـات الأخـرى. يمكـن أن نسـتنتج أن اضـافة مسـتحلص الاخناسـيا بمعـدل 1.0 مـل /لتـر كـان أكثـر فائدة دون أي تأثير سلبي على أداء النمو أو الحالة الفسيولوجية بل بالعكس

الكلمات الدالة: الأداء الإنتاجي- دجاج التسمين

INTRODUCTION

INTRODUCTION

There is a little research concerning the effect of Echinacea purpurea extract (EPE) on performance of broilers chicks. For the past several decades, different strategies have been applied to improve poultry productivity and profitability. The most important of them were always directed towards maintaining health, reducing disease outbreak and improving general immunity. Today, the nonprescription use of antibiotics in poultry feeds has been eliminated or severely limited in many countries because of the potential risks associated with their use and development of resistant strains of bacteria, mainly in humans. Replacement to antibiotics, many feed additives such as prebiotics, probiotics, symbiotic, organic acids and herbal growth promoters are used as replacement of antibiotics having the activity against pathogenic microorganism and to enhance the growth of useful microorganism (**Chaudhary, M.T., 2012).** Therefore it is trending, many countries tended to minimize or prohibit the chemical components due to deleterious side effects on both animals and human. So, it is important to use natural promoters **(Hassan, I. I., A. A. Askar and G. A. El-Shourbagy, 2004).** One of these alternatives that do not have side effects and have many benefits is plant Echinacea (E) is a North American indigenous plant (family Asteraceae), which has been traditionally used as a "cure all" for different ailments. In recent years, it has become one of the most popular herbal products in North America and Europe as an immune promoter and immune stimulator **(GOEL et al., 2002),** and

Extract of this plant has many effects; the most important is that it Modulates the immune system **(Barret, 2003).** Many mechanisms have been associated with modulation of the immune system including, activate phagocytosis **(Bauer et al., 1989),** fibroblasts stimulator **(Schranner et al., 1989),** increase in respiratory activity **(Maas et al., 2005)** and increasing leukocyte motility (Bodinet et al., 2002). Medical effects of the herb are antiviral **(Eichler et al., 1994),** antioxidant, anti-inflammatory, antibiotic **(Barret, 2003)** and some other effects on natural killer cells **(Maas et al., 2005),** addition to Echinacea products can contain highly variable amounts of a variety of bioactive ingredients including caffeic acids, alkylamides, polysaccharides and glycoproteins **(Bauer and Wagner, 1991)**. In one of the experiences and conscience *E. purpurea* extract for at least 8 weeks. Improvement in feed conversion was reported by **(Maass et al. 2005)** in pig receiving *E. purpurea* cobs supplementation for at least two weeks.

In some in vitro experiments, it was found that extract of this herb (EP) has antiviral activity against several viruses **(Berman et al., 1998).** Also the herb is efficient in enhancing one of the prominent elements of inherent immunity system (Bodinet et al., 2004). Both acknowledged (**Jamroz, Wertelecki, Houszka and Kamel 2006)** found that herbal feed additives stimulated the gut mucosal secretion in broilers

MATERIALS AND METHODS

This study was carried out at the Poultry Experimental Station, Faculty of Veterinary Medicine belonging to University of Sadat city, Minoufiya Governorate, Egypt. The experiment was started on October 2018 and terminated on November 2018. The main objective of this study was to examine the effects of the effect of additive ***Echinacea purpurea Extract (EPE)*** on growth performance of broiler during fattening period extended from 1-42 days (d), as well as digestibility, carcass traits, some blood parameters and economic efficiency. In order to find out best nutrient supplements and appropriate doses to improve growth performance, digestibility, blood parameters and carcass traits.

Experimental design

In order to study the Effect of using different levels of extract Echinacea purpurea on broilers productive performance, A total number of 180 chicks were used from commercial flock from Eldesoky company broiler breeder (**IR Strain**) at 32 weeks (wks.) of age. All chicks were brooded together at the first 2 d. At the third day, 15 chicks of each replicate (45 for each experimental of groups), having average body weight around the d-old chick weight (37.37±1.0), Birds were allocated to 4 Treatment T1 (control positive), T2 (control negative), T3 supplemented EPE (0.5) and T4 supplemented with EPE (1.0) were used to measure their growth performance up to 42 d of age. Birds were allowed to free. Access to feed and water during the fattening period. The birds were kept in 12 floor pens ($3m^2$), which covered with wood shavings as litter material. Each pen was equipped with two hanging feeder and one drinker. The lighting cycle was 24 hrs. /d maintained, the chicks received starter diet till 1 to 10 d of age, grower diet from 11 to 24 d of age and finisher diet from 25 to 42 d of age. The experimental diets (starter, grower and finisher) were formulated to cover the nutrient requirement of broiler chicks from 1 to 42 d according to **IR breeder's company guideline (2014)** and experimental condition. Table (1) show the Ingredients, chemical composition and chemical analysis of grow-out excremental and basal diets during fattening periods (starter, grower and finisher). The chicks received standard broiler starter**,** grower and finisher diet without the addition of antioxidants, anticoccidiosis, no antibiotics and anticholesteric except group 1 (positive control).

Medical care and vaccination program

Chicks were vaccinated against Infectious disease. Vaccination program was applied during the growing period, however, programmed of multivitamin AD_3E were given at a dose of 1ml/L of water for a 3rd days for each week.

Also, during this period and according to sensitivity antibiotic was given to birds to avoid any bacterial infection during the experimental period. The antibiotic (Lincospictenomycin) was given at a dose of 1g/L of drinking water to control positive. The ambient temperature in experimental house was maintained at 32^o C during first week and gradually decreased by 2^o C in second and third week, and fixed at 24^o C thereafter

Data collected during the fattening period

Growth performance of broilers was evaluated by recording Initial body weight and Live body weight (LBW), body weight gain (BWG), Feed intake (FI), Feed conversion ratio (FCR), Protein and energy intake (PAEI), Protein and energy efficiency ratio (PAEER) and Mortality rate (MR) were calculated for each group at 1, 7, 14, 21, 28, 35 and 42 d of age.

Table (1): Ingredients and chemical composition of diets

Ingredients	Starter	Grower	Finisher
Ground yellow corn (8.5%).	57.060	63.220	69.50
Soybean meal (44.0%).	33.700	24.800	18.90
Corn gluten meal	3.750	6.000	6.00
Sun flower oil.	0.600	1.300	1.200
Lime stone	1.850	1.800	1.500
Mono calcium phosphate	1.400	1.200	1.100
L- lysine	0.320	1.800	1.500

Vit. & min premix1	0.300	0.300	0.300
Sodium chloride (Nacl).	0.300	0.300	0.299
DL-Methionine	0.235	0.220	0.223
Sodium bicarbonate	0.220	0.220	0.218
L-Theronine	0.065	0.070	0.114
Total (Kg)	**100.0**	**100.0**	**100.0**
Calculated diet composition:			
Crude protein %.	22.44	20.47	18.45
Metabolizable energy (Kcal ME/Kg).	3003	3152	2322
Lysine %.	1.280	1.200	1.06
Methionine %.	0.580	0.560	0.54
Methionine + Cysteine%.	0.960	0.910	0.87
Calcium %.	1.050	0.980	0.84
Available phosphorus %.	0.500	0.450	0.42

*Requirement according to IR broiler performance guide (2014) and NRC (1994).
** Pre-mix each 3 kg of vitamin and mixture contains: Vit A 12000 I.U., Vit D3 2000 I.U., Vit E 40 mg, Vit. K 34 mg, Vit. B l 3 mg, Vit. B2 6 mg, Vit. B6 4 mg, Vit. B12 0.03 mg, Niacin 30 mg, Biotin 0.08, mg, Pantothenic acid 12 mg , Folic acid 1.5 mg, Choline chloride 700 mg, Mn 80 mg , Cu 10 mg, Se. 0.2 mg, Fe 40 mg, Zn 70 mg and Co . 0.25mg.
*** Determined according to A.O.A.C. (2006).

Blood parameters

Blood samples were taken at 5 d, 22 d and 42 d of age. Approximately 3.0 ml of blood samples of 6 birds per treatment were collected between 2 AM and 4 PM, from the jugular veins, using sterile a syringes. Blood collected for serological tests was held at room temperature for 2 to 3 hrs., centrifuged (2,000 × *g* for 10 min at 4°C), and the resultant serum was stored at −20°C until analyzed. Later, all the serum samples were thawed and biochemical parameters were analyzed at the same time. Total serum Triglyceride **(TSGr)** and cholesterol **(TSC)** Serum total proteins **(TSP), Tp** Albumin, **Globulin**. **AST, ALT, Creatinine** and **urea**

Slaughter carcass traits.

At the end of growing period carcass characteristics were done. Were 10 birds were randomly selected from each treatment group to slaughter and determine carcass traits. Birds were deprived from feeds for 12 hrs. and weighed before slaughter. After sacrificed the birds allowed to bleed freely for (2 minutes) and reweighed to obtain blood weight. The feathers were plucked manually, after that the birds were weighted to obtain feather weight. Carcass was eviscerated by hand and individually reweighed after the removal of head neck shanks, viscera, and internal organs including (liver, gizzard and heart). Giblets were calculated in relation to live body weight.

The internal organs including edible parts (liver, heart and gizzard) and inedible parts (viscera) were carefully separated and accurately weighed. The small intestines were individually weighed for each carcass alone and their lengths were measured by measure tap. Also some lymphoid organs including spleen, Bursa of Fabricius and thymus weighed and calculated as a percentage of live body weight.

Economic Efficiency

To determine the economic efficiency of the diets for meat production, the management factors (heating, lighting, vaccinations and medications) in all dietary treatments are stabilized. The price of the experimental diets was calculated according to the price of the used ingredients of the local market at the time of the study. So, the cost of feed consumed of each treatment was easy to be calculated. The economic efficiency was calculated as the feed cost needed to obtain one kilogram of LBWG as according to **(Bayoumi, 1980)**.

Statistical analysis. The statistical analysis for the feeding trials were performed by using the general linear model (GLM) procedures according to **SAS (2009)** and significant mean differences between treatment means were distinguished by Duncan's Multiple Range Test **(Duncan, 1955)**. All statements of significance were based on $P \leq 0.05$. The statistical model used in the experiment was as following:

$Yij = M + Ti + Eij$

Where:

M = the overall mean.

Yij = the individual observation.

Ti = treatment effect.

Eij = the experimental error

RESULTS AND DISCUSSION

In the present study Table (2). The results showed that the highest live body weight was recorded in control+ve (290.93g) *and Echinacea* extract (1.0 ml/L, 290.11g) but the lowest value was observed in control-ve group (275.13g) at 14 days old.

At 28 and 42 days of experiment, broilers Echinacea purpurea Extract (1.0ml/l) as well as those in control+ve group had significant ($P < 0.05$) higher live body weight than control-ve group (Table 2). Although the group *Echinacea* extract (1.0 ml/l) was withdrawn from 2% protein, it obtained a higher weight especially in 14 days of age. Therefore, adding 1 ml of Echinacea to diet may compensate the decrease in protein level.

Live body weight gain (LBWG) was significantly affected by supplementation of feed additive as shown in Table (1). LBWG values were ranged between 253.23 to 252.65.g in group control +ve and EP (1.0) at 14 days of experiment. However, at 28, 42 and days of broiler's age, LBWG was significant higher in group EPE (1.0) treated with feed additive as well as control +ve group than control –ve group. These results were agreement with **Sugiharto, (2014)** alternative substances for disease control, particularly natural products, is highly encouraged not only for solving the problem of drug accumulation in the meat, but also for their beneficial effects on the gut microbiota or for their immunomodulatory properties, resulting in improved production performances. Additionally, the current results were agreement with **Ertas ON,et al.,(2005)** and **Alçiçek A, et al., (2003)** who reported that the use of aromatic plants in broilers significantly improved live weight gain and feed efficiency

Table (2). Means ± SE of live body weight (LBW), total gain (TG), , feed conversion (FCR) and performance index (PI) of growing broiler as affected by different levels of Echinacea purpurea Extract .

Treatment / Items	T1 Control (+)	T2 Control (-)	T3 E (0.5)	T4 E (1.0)	Sig.
Body weight (g).					
0 days	**37.69 ±0.39**	**38.27±0.39**	**37.37±0.36**	**37.46±0.35**	**NS**
14 day	**290.93^{a} ±3.31**	**275.33^{c}±1.83**	**284.22^{bc}±2.43**	**290.11^{a}±3.20**	*
28 days	**1214.0^{a} ±18.28**	**1084.89^{b}±20.14**	**1171.78^{a}±14.79**	**1206.33^{a}±19.01**	*
42days	**2505.7^{ab} ±41.54**	**2330.67^{c}±41.9**	**2393.67^{bc}±37.04**	**2490.78^{ab}±53.41**	*
body weight gain					
14 days		**237.06^{c}±1.87**			*
28 days	**253.23^{a} ±3.44**	**809.55^{b}±20.25**	**246.84^{ab}±2.41**	**252.65^{a}±3.25**	*
42 days	**923.06^{a} ±19.28**	**1245.78^{b}±42.06**	**887.55^{a}±14.94**	**916.22^{a}±19.11**	*
Total gain	**1291.78^{ab} ±37.16**	**2292.40^{c}±40.02**	**1221.89^{b}±38.06**	**1284.44^{ab}±53.93**	*
Feed Conversion ratio	**2468.0 ^{ab}± 41.59**		**2356.2b^{c}±37.08**	**2453.3^{ab}±53.49**	
14 days		**1.86^{a} ± 0.01**			
28 days	**1.71^{cd} ± 0.02**	**1.26^{b} ± 0.03**	**1.75^{cd} ± 0.01**	**1.71^{d} ±0.02**	*
42 days	**1.07 ^{a} ±0.02**	**1.91^{ab} ±0.66**	**1.10^{b} ±0.01**	**1.07^{b} ±0.02**	*
Total	**1.79 ^{ab} ±0.05**	**0.91^{a} ±0.01**	**1.90^{a} ±0.06**	**1.86^{a} ±0.08**	*
Performance index	**0.83^{bc} ±0.01**		**0.86^{b} ±0.01**	**0.83^{bc} ±0.01**	*
14 days	**17.20 ^{a} ±0.41**		**16.36^{ab}±0.29**	**17.18^{a} ±0.40**	
28 days	**117.01^{ab} ±3.92**	**14.87^{c} ±0.21**	**108.29^{b} ±3.12**	**116.00^{ab}± 4.23**	
42 days	**148.38^{abc}± 6.49**	**90.43^{c} ±3.74**	**134.38^{bc} ±6.08**	**149.97^{abc}±9.66**	
Total	**309.36^{ab}±10.20**	**130.99^{c} ±6.69**	**282.13^{bc} ±8.71**	**309.58^{ab}±13.78**	
		262.38^{c} ±9.62			

$^{a, b, c, d ....}$ means with different superscripts in the same column within item differ significantly (P≤ 0.5)

*T1 Control positive

*T2 Control negative

* T3 Echinacea purpurea (0.5)

*T4 Echinacea purpurea (1.0

Feed intake

Weekly feed intake of experimental broilers was affected significantly ($p<0.05$) by *Echinacea purpurea Extract* supplementation as shown in Table (2) The lowest total FI was recorded in groupT4 (2014.69g) that fed EPE(1.0ml/l) followed by T3,T1 and then T2 group (2020.31, 2023.23 and 2065.4g, (Table 2). On contrary, group T2 consumed the highest feed intake in the current experimental.

Addition of EPE improves the digestibility, absorption and utilization factor of the feed. which increases the body's immunity and as an antioxidant, These results were agreement with **Tadjong et al. (2017)** who reported that feed intake, live body weight, weight gain and feed conversion ratio are affected by oregano essential oil in broiler diets.,

Feed conversion ratio (FCR)

Table (2) illustrated that FCR was significantly differed ($p<0.05$) between all treatments throughout different ages as well as total FCR. The best value was in group T4 (1.71) and T3 (1.75) when compared with control-ve (1.86) group at 14 days old (Table 2). However, at 28 days of broiler's age, FCR was significantly lower in all groups supplementation with *Echinacea purpurea Extract* as well as control+vegroup than control -ve group. Also, at 42 days of experiment, group T4 (1.86) showed less FCR than T2 (1.91), T3 (1.90) The improved FCR that recorded in the current study may be attributed to the recovery of damaged digestive wall cells and the preservation of microbial balance and improved the nutrient utilization of broilers in the supplemented groups these agreement with the findings of **Maass et al. (2005)** who reported that E. purpurea botanicals (herbs and/or spices), supplementation as feed additive improved feed conversion. While, **Ma et al. (2009)** reported that E. purpurea extract significantly lowered the feed Conversion efficiency in broilers.

The improvement of feed conversion ratio with feeding E. purpurea is in agreement with the findings of **Maass et al. (2005)** who also reported that E. purpurea botanicals(herbs and/or spices), supplementation as feed additive

Carcass characteristies:

In the proportion of feather to live body weight was significantly higher in group T1 (control+ve) than other treatment groups. In Table (3), broilers showed significantly ($P>0.5$) differences in abdominal fat present between groups fed with EPE. Broilers in control+ve group had more abdominal fat content than other groups T3, T2, and T4. However, group fed EPE (1.0ml/l) had lowest value in abdominal fat present (Table 5). These rustles agreement The significant decrease of abdominal fat % may be due to that group E.P. extract (1.0) was rich in volatile oils, protein, fat, sugars and vitamins (**Ansary, 1975)** which had beneficial effect for stimulation and activity of digestive system. Table (6) clarified that gall bladder percent to LBW in group T4 was more than in groups T2, T3 and T1,

In relation to bursa of fabricius weight present broiler fed T3 EP (0.5) had heavier bursa weight than T1, T4 and T2. However, other groups T1, T2 and T4 were similar in bursa present.

These results agreement with **Rudrappa & Humphrey, (2007)** who reported that bursa plays an important role in the enzymatic maturation and acquiring of the immunologic competence of T and B lymphocytes.

Crop weight percent was significantly increased in groups T1 and T4 while other groups.

In the current study the data related to viscera percent in relation to live body weight were shown in Table (5). Group T4 had significantly higher viscera percent in compared with groups T2 and T3. The lowest viscera percent was recorded in groups T1 followed by T2, T3, T4 (1.50, 2.0, 3.50, 4.0%, respectively).

The highest carcass percent was observed in groups T4, T2 and T3 when compared with groups T1.

Table (3). Means ± SE of Carcass characteristies of growing broiler as affected by different levels of

Treatment Items	T1 Control (+)	T2 Control (-)	T3 E (0.5)	T4 E (1.0)	Sig.
Feather	19.04^{a}±0.66	14.49^{bc}±	12.86^{cd}±0.42	12.89^{cd}	*
Blood	1.72±0.17	1.94	1.99±0.04	1.78	NS
Abdominal fat	1.57^{a}±0.06	0.78^{bc}	1.00^{abc}±0.29	0.68^{bc}	*
Head	2.30^{ab}±0.03	20.12^{b}	2.65^{ab}±0.04	2.10^{ab}	*
Legs	2.63±.043	3.50	3.45±0.43	4.04^{b}	NS
Spleen	0.16±0.02	0.13	0.12±0.01	0.13	NS
Heart	0.50±0.03	0.51	0.63±0.06	0.54	NS
Liver Gall blader	1.80b^{c}±0.03	1.83^{ab}	1.55^{cd}±0.11	1.58^{cde}	*
Intestine	0.05b^{cd}±0.00	0.06^{d}	0.05^{ab}±0.00	0.07^{ab}	*
proventriculs	4.48±0.41	4.50	3.83±0.39	3.88^{ab}	NS
Gizzard	0.47±0.10	0.45	0.41±0.00	0.45	NS
Lungs Bursa	2.45±0.30	1.90	1.76±0.31	1.27	NS
Crop Ceca Empity	0.60±0.10	0.54	0.58±0.13	0.49	NS
Carcass	0.23^{ab}±0.01	0.17^{ab}	0.26^{a}±0.07	0.17^{ab}	*
Viscera	0.63^{a}±0.09	0.28^{b}	0.42^{ab}±0.00	0.48^{ab}	*
	0.33±0.01	0.32	0.32±0.00	0.35^{ab}	NS
	9.69±1.37	9.40	8.54±0.20	8.05	NS
	74.81^{b}±.94	78.45^{a}	78.01^{a}±0.65	78.51^{a}	*
	1.50^{c}±0.50	2.00^{b}	3.50^{ab}±0.50	4.00^{a}	*

Echinacea purpurea Extract.

a, b, c, d …, means with different superscripts in the same column within item differ significantly (P≤ 0.5)

*T1 Control positive ; *T2 Control negative ; T3 Echinacea purpurea (0.5) ; *T4 Echinacea purpurea (1.0

Blood, legs, spleen, heat, intestine, proventriculs, gizzard, lungs and ceca were non- significantly different between all groups as shown in Table (5). Similar data were reported by **Denli et al., (2003)** who found that organic acids resulted in remarkable increase in the intestinal weight and length of broiler chicken.

Serum biochemical parameters: Blood Chemistry at 15days and 42days of experimental broilers as affected by *Echinacea purpurea is* described in Table (4). Total protein, albumin and globulin as well as triglycerides and cholesterol were non- significantly different between all groups. However, liver function showed increasing in ALT enzyme in groups T4 and T1 compared with T2and T3. While, AST enzyme

Table (4). Means ± SE of Blood Chemistry at the end of the experimental broilers as affected by some Echinacea purpurea extaract.

Treatment / Items	Blood Chemistry at the end at: T1 Control (+)	T2 Control (-)	T3 E (0.5)	T4 E (1.0)	Sig.
Total protien	3.42±0.28	3.48±0.13	3.63±0.39	3.09±0.16	NS
Albumin	1.34±0.06	1.91±0.56	1.20±0.07	1.18±0.07	NS
Globulin	2.08±0.30	2.16±0.13	2.43±0.40	1.90±0.22	NS
Triglycerides	117.15±12.13	95.32±6.26	102.19±6.01	99.63±12.81	NS
cholesterol	210.03^{ab}±7.03	225.24^{ab}±8.90	206.47^{ab}±6.85	191.74^{b}±6.44	*
ALT	40.27^{abc}±6.10	40.04^{abc}±10.72	10.86^{c}±3.02	48.02^{abc}±13.71	*
AST	240.25^{ab}±39.10	196.60^{b}±22.69	199.96^{b}±39.58	219.25^{ab}±15.06	*
urea	3.99^{ab}±0.41	5.28^{ab}±0.56	5.80^{a}±0.34	4.56^{ab}±1.21	*
Creatinine	0.42^{ab}±0.09	0.41^{ab}±0.05	0.32^{b}±0.08	0.46^{ab}±0.17	*

[a, b, c, d ...,] means with different superscripts in the same column within item differ significantly (P≤ 0.5)

*T1 Control positive

*T2 Control negative

* T3 Echinacea purpurea (0.5)

*T4 Echinacea purpurea (1.0

was similar between all groups (Table 4). According to kidney function, broilers in groups T3 and T2 had higher serum urea levels than groups T1 and T4. However, serum creatinine level was non-significantly differed between groups at 15 days of experiment (Table 4).

At 42days of experiment, total protein, albumin, globulin and triglycerides were non- significantly differed between groups. At 6th week of experiment, E.P extract supplementation elevated the level of serum globulin numerically, which acts as an indicator of immune response and source of antibody **(Abdel-Fattah et al., 2008)** and immunoglobulins production. But serum cholesterol level was high T2 (control-ve) in compared with groups T4, T4,T1 and T3. Consistent with these findings, **Saiafzadeh & Jahanian (2013)** who reported that dietary inclusion of EP powder increased serum HDL during both 35-d periods

CONCLUSION

In general, based on the obtained results reported in this study, Adding echinacea purpurea extract at a ratio of (1.0 ml /liter) to poultry diets led to a clear improvement in production performance (body weight. The rate of feed consumption is lower. And the feed conversion ratio is good) and from the economic point of view, saving in the price of the diet and not using antioxidants, anti-coccidiosis and antibiotics and thus a safety rate for consumers (humans).

REFERENCES

Hassan, I.I.; Askar, A.A. and El-Shourbagy, G.A. (2004). Influence of some medicinal plants on performance; physiological and meat quality traits of broiler chicks. Egypt. Poult. Sci., 24: 247-266.

Goel V., Chang C., Slama J. V., Barton R., Bauer R., Gahler R., Basu T. K. (2002). Echinacea stimulates macrophage function in the lung and spleen of normal rats. Journal of Nutritional Biochemistry, 13, 487–492.

Barrett, B. (2003). Medicinal properties of Echinacea: A critical review. Phytomedicine, 10, 66–86.

Bauer R, Remiger P, Jurcic K, Wagner H (1989). Beeinflussung der Phagozytose-Aktivität durch Echinacea-Extrakte [Influence of Echinacea extract on phagocytotic activity. Reviewed in translation, translator unknown. Zeits. fur Phyto. 10:43-48

Schranner I, Würdinger M, Klumpp N, Lösch U, Okpanyi SN (1989). Modification of avian humoral immunoreactions by Influex and Echinacea angustifolia extract. Zen. Vet. B. 36:353-364

Maas N, Bauer J, Paulicks BR, Bohmer BM, Mair DA (2005). Efficiency of Echinacea purpurea on performance and immune status in pigs. J. Anim. Physiol. Anim. Nutr. 89:244.

Bodinet C, Lindequist U, Teuscher E, Freudenstein J (2002). Effect of an orally applied herbal immunomodulator on cytokine induction and antibody response in normal and immunosuppressed mice. Phytomedicine. 9:606-613.

Eichler F, Krüger GR (1994). Effects of nonspecific immunostimulants (Echinacin, isoprinosine, and thymus factors) on the infection and antigen expression in herpesvirus- 6 exposed human lymphoid cells. In vivo 8:565-576.

Bauer R, Wagner H (1991). Echinacea species as potential immunostimulatory drugs. In: Economic and medicinal plant research, Wagner H, (Eds.), Academic Press Limited, London, U.K. pp. 243-321

Berman S, Justis JC, Tilles JG (1998). Dramatic increase in immune mediated HIV killing activity induced by Echinacea angustifolia. Int. Conf. AIDS. 12:582.

Bodinet C, Lindequist U, Teuscher E, Freudenstein J (2004). Influence of peroral application of herbal immunomodulator on the antibody production of Peyer's patches cells. Arzneimittelforschung. 54:114- 118.

Jamroz D., T. Wertelecki, M. Houszka and C. Kamel.(2006): Influence of diet type on the inclusion of plant origin active substances on morphological and histochemical characteristics of the stomach and jejunum walls in chicken. J. Anim. Physiol. Anim. Nutr. 90: 255–268.

BAYOUMI, S. B., (1980). Effect of different ration on egg production of breeding hens. M. Sc. Thesis, Fac. Of Agric. Kafr El-Sheikh, Tanta Univ.

Sugiharto S. (2014). Role of nutraceuticals in gut health and growth performance of poultry. J. Saudi Soc. Agric. Sci., doi:10.1016/j.jssas.2014.06.001.

Ertas, O.N., T. Guler, M. Ciftci, B. Dalkilic and G.U. Simsek, 2005. The effect of an essential oil mix derived from oregano, clove and anise on broiler performance. Int. J. Poult. Sci., 4: 879-884

Alçiçek, A., M. Bozkurt and M. Çabuk, 2003. The effect of essential oil combination derived from selected herbs growing wild in Turkey on broiler performance. South Afr. J. Anim. Sci., 33: 89-94.

Tadjong N. R., Kana J. R.,*, Necdem T. B., Yemdjie M. D. D., Mube K. H. , Kuiede S. , Teguia A. and Meimandipour A. Performances of Broiler Chickens Fed on Diet Supplemented with Thyme and Oregano Essential Oils Stabilized in a Plant Charcoal Matrix J. World Poult. Res. 7(2): 79-87, June 25, 2017.

Ma A, Shi W, Niu X, Wang M, Zhong X (2009). Effects of Echinacea purpurea extract on the immunological response to infectious bursal disease vaccine in broilers. Front. Agr. China. 3:1-5

RUDRAPPA, S.G. & HUMPHREY, B.D. (2007) Energy metabolism in developing chicken lymphocytes is altered during the embryonic to posthatch transition. Journal of Nutrition, 137: 427–432.

DENLI, M., OKAN, F. AND CELIK, K., 2003. Effect of dietary probiotic, organic acid and antibiotic supplementation to diets on broiler performance and carcass yield. Pak. J. Nutr., 2: 89-91.

S.A. Abdel-Fattah, M.H. El-Sanhoury, N.M. El-Mednay, F. Abdel-AzeemThyroid activity, some blood constituents, organs morphology and performance of broiler chicks fed supplemental organic acids Int J Poultry Sci, 7 (2008), pp. 215-222

Saiafzadeh S, Jahanian R. 2013. Influence of genistein on internal yolk quality and antibody responses of laying hens during mid-production. 19th European Symposium on Poultry Nutrition, August 26–29, 2013, Potsdam, Germany. P.1–5.

Chaudhary, M.T., (2012). Effect of supplementation of citric acid in broiler performance. M.sc (Hons) Thesis department of poultry science, university of agriculture Faisalabad.

دراسة تأثير إضافة مستويات مختلفة من مستخلص الاخناسيا بيربورا على الأداء الإنتاجي لدجاج التسمين

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الملخص العربى

هناك القليل من الابحاث حول تأثير مستخلص الاخناسيا بوربوريا(Ehinacea purpurea Extract (EPE على أداء دجاج التسمين. لهذا الغرض ، كان الهدف الرئيسي من هذه الدراسة هو التحقق من تأثير مستخلص (Ehinacea purpurea (EPE على الأداء والحالة الصحية للدجاج اللاحم من 1 إلى 42 يومًا من العمر ،تم استخدام سلالة انديان ريفر (IR) وتم تقسيم الكتاكيت عشوائياً إلى 4 معاملات متساوية فى كل معامله 3 مكررات لكل منها (15 طائر / مكرره). المعامله الاولى (الكنترول الموجب) ، المعامله الثانيه (الكنترول السالب) ، المعامله الثالثه (الكنترول السالب + إشنسا 0.5 مل / لتر) و المعامله الرابعه (الكنترول السالب + إشنسا 1.0 مل / لتر) وتم توفيرإضاءه وعلف ودرجة حراره ورطوبه مناسبه طوال التجربه . وتم تقييم مؤشرات الاداء الإنتاجى أسبوعيا في فترات مختلفة من التجربة حتى نهاية التجربة (42) يوم وفى نهاية التجربه تم اجراء الذبح لعدد 10 طيور من كل معاملة لتحديد الخصائص التفصيلية لمؤشر أداء الذبيحة . كما تم أخذ عينات دم من كل معامله على حدة لتقييم الحالة الصحية والاستجابة المناعية وأشارت النتائج إلى أن دجاج التسمين المعامل بمستخلص الاخناسيا (EPE 1.0) مل / لتر كان أفضل أداء ($P\leq0.05$) مقارنة بالمجموعات الأخرى . أما النسبة المئوية لوزن الدهون في منطقة البطن فقد سجلت قيمًا أقل للطيور المعالجة بـ (EPE (1.0 مل/ لتر .في هذا السياق ، كانت الأعضاء اللمفاوية والاستجابة المناعية أفضل بالنسبة للدجاج التي تم اضافة (EPE 1.0) مل /لتر من المجموعات الأخرى. يمكن أن نستنتج أن اضافة مستحلص الاخناسيا بمعدل 1.0 مل /لتر كان أكثر فائدة دون أي تأثير سلبي على أداء النمو أو الحالة الفسيولوجية بل بالعكس