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EFFECTIVENESS OF ADDING *ECHINACEA PURPUREA* TO FEED OF BROILER CHICKS

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ABSTRACT: This study aims to shed light on the feasibility of using *Echinacea purpurea* (EP) in the diet of broiler chicks and its effectiveness in improving performance and health status. A total of 96 day old Cobb broilers were randomly allocated to 4 treatments, with 3 replicates per treatment and 8 birds each replicate. The experiment lasted 42 days. The dietary treatments administered were as follows: the first group served as the control and received the basal diet without any additional supplementation. The second, third and fourth groups received the basal diet supplemented with 0.5, 1.0 and 1.5% of EP, respectively. The results showed that supplementation of EP to the diet improved body weight, body weight gain, feed intake and feed conversion ratio. Addition of Echinacea has significantly ($P \leq 0.05$) increased red blood cells (RBC), white blood cells (WBC), hemoglobin, serum protein, albumin and globulin values. On the other hand, serum triglyceride, cholesterol and LDL were decreased while HDL increased. The activity of total antioxidant capacity (TAC) and glutathione peroxidase (GSH-Px) was increased, while malondialdehyde (MDA) levels decreased. Echinacea addition significantly ($P \leq 0.05$) increased the percentage of carcass, heart weight and intestinal length, while it decreased the relative weight of abdominal fat in broiler chicks. Moreover, dietary supplementation of EP especially at 0.5 and 1.0%increased the relative weight of spleen, bursa and thymus. Adding 0.5% and 1.0% EP recorded higher net revenue and economic efficiency.

In conclusion, the results from this study indicated that addition of 0.5 and 1.0% Echinacea could be effectively used in the diet of broilers without any adverse effects. Moreover, the best result was obtained by supplementing 0.5% Echinacea which has a beneficial effect on the performance, physiological, immune status and economic return of broiler chicks.

Key words: Echinacea, broilers, growth, carcass, blood, economic efficiency.

INTRODUCTION

Poultry is one of the most successful and fast growing industry that provides high quality protein at an economical price. There are many efforts made by breeders and researchers to increase poultry productivity and economic returns. These efforts also included reducing the spread of diseases, increasing bird immunity, reducing environmental pollution, and satisfying consumer tastes. The use of medicinal plants in poultry feed has beneficial effects on improving feed consumption, stimulating immunity, and being antioxidant and anti-inflammatory. *Echinacea purpurea* (EP) (family Asteraceae) belong to the group of phytogenic immune stimulants that help in establishment and strengthening of para-immunity and are reported to possess a number of pharmacologically active substances (Nasir and Grashorn, 2009). The most important components of EP are alkylamides, polysaccharides, glycoproteins, flavonoids and phenolic compounds, which include derivatives of caffeic acid, like caffeic acid, chicoric acid, caftaric acid, chlorogenic acid and echinacoside (Awortwe et al., 2021; Burlou-Nagy et al., 2022 and Ren et al., 2023).These substances are mainly responsible for anti-inflammatory, antioxidant, antiviral, immune regulation, and macrophage regulation (Ye et al., 2019; Ravazzolo et al., 2022 and Vieira et al., 2023;).

Thus, this study aims to shed light on the feasibility of using Echinacea in the diet of broiler chicks and its effectiveness in improving performance and health status.

MATERIALS AND METHODS

The present experiment was conducted at El-Sabahia Poultry Research Station, Animal Production Research Institute, Agriculture Research Center, Giza, Egypt.

Ninety-six unsexed day-old Cobb-500 broiler chicks were randomly distributed into four groups. Each group consists of 3 replicates; each replicate contains 8 chicks. The experimental period lasted for 6 weeks.The chicks were raised under identical management conditions and were provided with the same basal diet throughout the experiment. The dietary treatments administered were as follows: the first group served as the control and received the basal diet without any additional supplementation. The second, third and fourth groups received the basal diet supplemented with 0.5, 1.0 and 1.5% of EP, respectively.

Housing and husbandry:

The chicks were housed in battery brooders within an open house that featured two exhaust fans for ventilation. They were provided with *ad-libitum* feeding and continuous access to water throughout the entire experimental duration.

The birds were received starter grower diet till three weeks of age then finisher diet from the fourth to sixth weeks of the age. The basal experimental diets were formulated based on the Cobb requirements for broilers (Table 1). All chicks were wing-banded and the lighting program consisted of 23 h light and 1 h of darkness. All chicks in each group were kept under similar conditions of environmental and hygienic management. The temperature was adjusted on 35◦C on the first days of chick arrival, which was held until the end of the first week. Then the temperature was gradually reduced to 22◦C on day 22 and held at this level by the end of the period.

Performance traits:

Individual live body weight (LBW), body weight gain (BWG), feed consumption (FC), and feed conversion ratio (FCR) were assessed weekly and computed over the entire experimental duration (one day–42 days of age) for each experimental group.

Blood analyses:

Blood samples were taken at the end of the experiment at 42 days of age at the time of slaughter; six fasted birds from each treatment group (two birds per replicate) were randomly taken for slaughter. From each of the birds taken, two sets of blood

samples were collected during slaughter. One set of blood samples was collected in 5ml tubes containing an anticoagulant, ethylene diaminetetra-acetic acid (EDTA) for determining the red blood cell count (RBC), white blood cell count (WBC) and Hemoglobin (Hb). The other set of blood samples was collected in 5ml tubes that did not contain any anticoagulant. The tubes without coagulated were centrifuged for 20 minutes at 4000 rpm to collect the serum before they were stored at -20◦C pending analyses. Additionally, serum parameters such as total protein, albumin, triglycerides, cholesterol, low density lipoprotein (LDL), high-density lipoprotein (HDL), alanine amino transferase (ALT) and aspartate amino transferase (AST) levels were determined. Globulin values were obtained by subtracting the values of albumin from the corresponding values of total protein. Moreover, activities of total antioxidant capacity (TAC), malondialdehyde (MDA) and glutathione peroxidase (GSH-Px) were recorded.

Slaughter traits:

At the end of the experimental period (42 days of age), the six selected birds were individually weighed and slaughtered. The carcass was eviscerated and edible parts (gizzard, liver and heart) were weighed. The percentage of carcass, edible parts, lymphoid organs (spleen, Bursa of Fabricius and thymus) and abdominal fat was then calculated relative to live body weight. The length of intestines was individually measured.

Statistical analysis:

Data were subjected to the one-way ANOVA procedure using a statistical analysis system (SAS, 2004) with the following model:

$Y_{ij} = \mu + T_i + e_{ij}$

Where Y_{ij} = an observation; μ= overall mean; T_i= effect of i^{th} treatment and e_{ij} = experimental random error. The difference among means was determined using Duncan's new multiple range test (Duncan, 1955) at $P<0.05$.

Economical evaluation:

The price of the diets, Echinacea supplements and chicks was obtained according to the local market price at the same time of the experiment by the Egyptian pound (L.E.).The total cost (L.E) was calculated using the following equation:

Total cost (LE) = (cost of Kg feed× total feed consumption) + chick cost at hatch.

Net revenue = Total market price - Total cost.

Economic efficiency (EE) = (Net revenue LE /Total cost LE) × 100.

RESULTS AND DISCUSSION

Performance traits:

The results showed a significant ($p<0.05$) increase in body weight (BW), body weight gain (BWG) and feed intake (FI) of broiler chickens fed diet supplemented with *Echinacea purpurea* compared to the control group (Table 2).The addition of EP at Level 0.5 and 1.0% led to an increase in FI, especially at the age of 6 weeks. A significant ($p<0.05$) improvement was observed in the feed conversion (FC) of chicks supplemented with Echinacea at levels 0.5 and 1.0% during the period from 0 to 3 weeks of age compared with others. It was found that adding EP significantly improved FC during the periods 4-6 and 0-6 weeks compared to control and the best one was 0.5% EP. This improvement of BW, BWG and FC with feeding EP is in agreement with the findings of Rady et al. (2023) and El-Sayed Wahdan et al. (2018) who reported that Echinacea supplementation improved BW, BWG and FC. Shen et al. (2020) found that 200 mg of EP can improve the growth and quality of broiler meat by lowering feed-to-gain ratios, and increasing average daily gain. Additionally, Hashem et al. (2020) and Bagno et al. (2021) found that including EP in the diet of broilers increased BWG. On the other hand, Nosrati et al. (2017) discovered that adding EP at 2.5cc/L for 4 d after each vaccination did not influence growth performance

measures. The improvement that occurred with the use of Echinacea is due to the increase of intestinal villi height that leads to improved absorption of nutrients and increased body weight (Gurbuz et al., 2010). Moreover, the improvement in the performance of chicks fed with EP is due to its active ingredients that stimulate digestive enzymes, which in turn stimulate the appetite of birds (Krauze, 2021 and Ashour et al., 2025).

Blood analyses:

The effect of dietary supplementation of EP on the hematological parameters of the experimental birds is presented in Table 3. A significant increase ($p < 0.05$) was observed in the values of RBC, WBC and Hb when addition EP to the diet compared to the control. These results are consistent with the studies of O'neillet et al. (2002) who suggested that Echinacea acted as a hematinic agent by increasing the hemoglobin levels and total erythrocyte count, which may be related to improving the exercise performance by increasing oxygen transport. The increase in WBC was consistent with El-Sayed Wahdan et al. (2018) and Dehkordi et al. (2020) who found that adding EP led to an increase in white blood cells. This may be due to the ability of Echinacea to improve the health and immune status of broiler chicks.

Table 3 showed the effects of feeding dietary EP on serum indices of broiler chicks at 6 weeks of age. Significant differences ($p < 0.05$) were observed in total serum protein, albumin and globulin values as a result of dietary Echinacea. Birds fed dietary additive had the highest ($p < 0.05$) total serum protein and globulin compared to the control group. Albumin value in serum was increased significantly by supplemented 0.5 and 1% EP compared with others. This result is in line with Rady et al. (2023) who found that adding Echinacea at a level of 1% led to an increase in total protein, albumin and globulin in the serum for broiler chicks. No significant difference ($p > 0.05$) was recorded in ALT and AST values for broiler chicks. This obtained result in Echinacea agreed with El-Sayed Wahdan et al. (2018) and Abd-Allah et al. (2018) who reported that the serum activity of ALT and AST remained unchanged at EP dietary supplementation. This indicates the safe use of EP, which has been found to have no harmful effect on the liver.

A significant decrease in serum triglyceride, cholesterol and LDL was observed, while HDL increased as a result of adding EP to the feed of broiler chicks. It was found that adding Echinacea at 0.5% resulted in the highest significant decrease in serum cholesterol, LDL and triglycerides, while the same dose resulted in an increase in HDL level compared to 1.5% EP and control. These results were in agreement with Abd-Allah et al. (2018) who showed a significant reduction in levels of cholesterol, triglycerides and LDL while HDL level showed a significant increase in the chicks supplemented with 0.5 gm/ kg diet of Echinacea. Moreover, EP supplementation significantly decreased serum levels of cholesterol and LDL and increased HDL (Rahimi et al., 2011 and Nosrati et al., 2017). The reduction in the level of triglyceride in the blood, increase the proportion of HDL cholesterol due to inhibition of 3-hydroxy-3-methylglutaryl reductase coenzyme A, a key enzyme in the synthesis of cholesterol (Krauze, 2021). Therefore, the supplementation of EP with low levels (0.5%) decreases triglyceride, total cholesterol and LDL and increases HDL.

The present result refers to the addition of EP significantly glutathione peroxidase (GPX) and total antioxidant capacity (TAC) while the level of malondialdehyde (MDA) in the serum decreased. These findings are in agreement with those of Abd-Allah et al. (2018) who mentioned that the application of EP in broilers increased GSH level while decreasing MDA. This means that the birds' immunity increases

significantly when Echinacea purpurea is added to their feed.

Slaughter traits:

Considering the effect of adding Echinacea to broiler feed on carcass characteristics presented in Table 4, adding EP to broiler feed resulted in a significant improvement in the percentage of the carcass, heart weight and intestinal length, while it significantly decreased the relative weight of abdominal fat in broiler chicks compared to control. In addition, it was found that adding EP at levels of 0.5and 1.0% led to a significant increase in the relative weight of the spleen, bursa, and thymus. This result indicated that adding EP to broiler feed increases the immunity of birds and confirms the result obtained from the blood results for increasing immunity. As for feeding EP, it did not affect the relative weight of the gizzard and liver. These findings partially agree with Awad et al. (2020) who stated that the percentage of eviscerated carcass and total edible parts was elevated by adding 0.5 and 0.75% EP, while the percentage of abdominal fat was lowered by all EP levels added to the diet as compared with the control group. Additionally, Rady et al. (2023) pointed out that adding Echinacea at 1% to the broiler chick's diet increased the relative weight of the bursa and thymus while decreasing the relative weight of the spleen and liver. Habibi and Firouzi (2017) reported that administration of Echinacea purpurea at 1% from 1 to 42 days had increased Bursa and Thymus weights.

Economical evaluation:

Table 5 revealed that feeding and total cost were increased by increased EP level to the diet compared to the control group. Adding 0.5% and 1.0% EP recorded the higher selling price, which reflected the net return compared to other treatments. While a decrease in economic efficiency when adding 1.5% of Echinacea compared to the control. The highest economic efficiency value of Echinacea was observed for chicks fed 0.5% EP.

In conclusion, the results from this study indicate that an addition of 0.5 and 1% EP could be effectively used in the diet of broilers without any adverse effects. Moreover, the best result obtained by supplementation 0.5 % Echinacea which has a beneficial effect on the performance, physiological, immune status and economic return of broiler chicks.

Table (1): The composition of the experimental basal diets.

Ingredients	Starter grower diet % (1-21 d)	Finisher diet % (purpurea 22-42d)
Yellow corn	55.07	59.08
Soya bean 46%	33.50	29.4
Corn gluten 60%	5.00	5.00
Corn oil	2.00	2.65
Limestone	1.35	1.00
Di-Calcium Phosphate	1.73	1.60
*Premix	0.30	0.30
L- Methionine	0.15	0.12
L- lysine	0.35	0.35
Salt (NaCl)	0.40	0.40
Choline chloride	0.05	0.05
Sodium bicarbonate	0.10	0.10
Total	100	100
Calculated analysis		
Crude protein %	23.00	21.50
Metabolizable energy (Kcal/Kg)	3000	3100
Calcium %	1.00	0.82
Available phosphorus%	0.47	0.41
Lysine %	1.44	1.14
Methionine %	0.56	0.47
Methionine + Cystine	0.93	0.78

*Each kg of vitamin and mineral mixture contains: 12 M IU vitamin A; 5 M IU D3; 80000 mg E; 4000 mg K; 4000 mg B1; 9000 mg B2; 4000 mg B6; 20 mg B12; 15000 mg pantothenic acid; 60000 mg Nicotinic acid; 2000 mg Folic acid; 150 mg Biotin; 400000 mg Choline Chloride; 15000 mg Copper sulphate; 1000 mg calcium Iodide; 40000 mg ferrous sulphate ; 100000 mg Manganese oxide ; 100000 mg Zinc oxide and 300 mg Selenium selenite.

Table (2): Effect of dietary *Echinacea purpurea* levels on body weight, body weight gain, feed intake and feed conversation ratio of broilers.

treatment's Age	Echinacea level %				SEM	P value
	0.0	0.5	1.0	1.5		
Body Weight (g)						
Hatch	42.9	42.7	42.9	42.8	0.782	0.122
3 wks.	741.25^{c}	837.50^{a}	833.75^{a}	780.42^{b}	6.855	0.000
6 wks.	2211.00^{c}	2646.58^{a}	2607.75^{a}	2491.58^{b}	25.48	0.000
Body weight gain (g)						
0-3 wks.	699.42^{c}	795.67^{a}	791.92^{a}	738.58^{b}	8.98	0.000
4-6 wks.	1469.75^{c}	1809.08^{a}	1774.00a^{b}	1711.17^{b}	30.51	0.000
0-6 wks.	2169.17^{c}	2604.75^{a}	2565.91^{a}	2449.75^{b}	37.97	0.000
feed intake(g/ bird)						
0-3 wks.	987.92^{c}	1022.50^{b}	1020.83^{b}	1041.67^{a}	4.22	0.000
4-6 wks.	2752.58	2878.33	2851.75	2777.08	21.55	0.116
0-6 wks.	3740.50^{b}	3900.83^{a}	3872.58^{a}	3818.75^{ab}	23.01	0.058
Feed Conversation Ratio (g feed /g gain)						
0-3 wks.	1.41^{a}	1.29^{b}	1.29^{b}	1.41^{a}	0.0145	0.000
4-6 wks.	1.87^{a}	1.59^{b}	1.61^{b}	1.62^{b}	0.0227	0.000
0-6 wks.	1.73^{a}	1.50^{c}	1.51^{bc}	1.56^{b}	0.0209	0.000

^{a,b,c} Means with the different letters in the same row are significantly different (P≤0.05). SEM= Standard error of means. P value = Probability level.

Table (3): Effect of dietary *Echinacea purpurea* levels on blood constituents of broilers

Trait	Echinacea level %				SEM	P value
	0.0	0.5	1.0	1.5		
RBCs (10^6/mm^3)	2.33^{b}	3.50^{a}	3.17^{a}	3.11^{a}	0.099	0.000
WBCs (10^3/mm^3)	5.17^{b}	8.09^{a}	8.00^{a}	7.83^{a}	0.189	0.000
Hb (g/dl)	9.50^{b}	12.33^{a}	12.33^{a}	12.17^{a}	0.188	0.000
Total protein (g/dl)	4.69^{b}	6.03^{a}	5.86^{a}	5.80^{a}	0.150	0.001
Albumin(g/dl)	2.51^{b}	2.99^{a}	2.92^{a}	2.83^{ab}	0.068	0.049
Globulin (g/dl)	2.18^{b}	3.04^{a}	2.94^{a}	2.97^{a}	0.095	0.000
triglyceride(mg/dl)	189.00^{a}	137.83^{d}	147.33^{c}	162.67^{b}	3.019	0.000
Cholesterol (mg/dl)	235.33^{a}	183.50^{c}	186.67^{c}	196.00^{b}	3.392	0.000
LDL (mg/dl)	175.33^{a}	91.50^{c}	96.67^{c}	105.33^{b}	5.150	0.000
HDL (mg/dl)	60.00^{b}	92.00^{a}	90.00^{a}	90.67^{a}	2.074	0.000
ALT (U/L)	49.17	47.50	48.33	48.00	0.748	0.890
AST (U/L)	63.54	61.00	61.17	63.33	0.631	0.780
TAC (mg/dl)	378.00^{b}	423.17^{a}	425.17^{a}	414.00^{a}	3.963	0.000
GSH-Px(mmol/ ml)	414.67^{b}	456.17^{a}	454.83^{a}	448.67^{a}	3.332	0.000
MDA(mmol /ml)	12.50^{a}	7.50^{b}	7.50^{b}	7.17^{b}	0.346	0.000

^{a,b,c,d} Means with the different letters in the same column are significantly different (P≤0.05). SEM= Standard error of means. P value = Probability level. LDL= Low density lipoprotein. HDL= High density lipoprotein. ALT= alanine amino transferase. AST=aspartate amino transferase. TAC= total antioxidants capacity. GSH-Px =glutathione peroxidase.MDA = malondialdehyde.

Table (4): Effect of dietary *Echinacea purpurea* levels on carcass traits of broilers.

Trait	Echinacea level %				SEM	P value
	0.0	0.5	1.0	1.5		
Carcass %	72.98[b]	75.80[a]	74.85[a]	74.65[a]	0.325	0.008
Gizzard %	2.16	1.97	1.83	1.76	0.065	0.120
Liver %	1.50	1.59	1.41	1.34	0.037	0.082
Heart %	0.35[b]	0.46[a]	0.45[a]	0.45[a]	0.011	0.000
Spleen %	0.09[c]	0.12[a]	0.11[ab]	0.10[bc]	0.003	0.006
Bursa %	0.09[c]	0.12[a]	0.11[ab]	0.10[bc]	0.002	0.002
Thymus %	0.25[c]	0.40[a]	0.22[b]	0.16[bc]	0.020	0.000
Abdominal fat %	1.04[a]	0.84[b]	0.62[c]	0.77[bc]	0.040	0.000
Intestinal length (cm)	138.33[c]	201.67[a]	158.67[b]	153.33[b]	0.720	0.003

[a,b,c] Means with the different letters in the same row are significantly different (P≤0.05).
SEM= Standard error of means. P value = Probability level.

Table (5): Effect of dietary *Echinacea purpurea* levels on the economic efficiency of broilers.

Trait	Echinacea level %			
	0.0	0.5	1.0	1.5
Total feed consumption(kg)	3.7405 23	3.9008	3.8726	3.8188
Cost of Kg feed[1] (LE)	13	24.35	25.7	27.05
Chick cost at hatch(LE)	99.03	13	13	13
Total cost[2] (LE)	2.2110	107.94	112.53	116.30
Body weight (kg)	161.40	2.6466	2.6078	2.4916
Total Market price[3] (LE)	62.37	193.20	190.37	181.89
Net revenue[4] (LE)	62.98	85.26	77.84	65.59
Economic efficiency[5] (EE)		78.99	69.17	56.40

[1]Price of Kg Echinacea (LE) = 270 LE.
[2]Total cost (LE) = (cost of Kg feedX total feed consumption) +Chick cost at hatch.
[3]Total Market Price = body weight X73 LE.
[4]Net Revenue (LE) = 3-2.
[5]Economic Efficiency (EE) = Net revenue / Total cost X100.

REFERENCES

Abd-Allah, O. A.;Kilany, O. E. and Elhosiny, M. E. 2018. Biochemical and immunological studies on the effect of echinacea purpura in broilers. Global Animal Science Journal-GASJ, 6(1): 1-10.

Ashour, E. A.; Aldhalmi, A. K.; Ismail, I. E.; Kamal, M.; Elolimy, A. A.; Swelum, A. A. and Abd El-Hack, M. E. 2025. The effect of using Echinacea extract as an immune system stimulant and antioxidant on blood indicators, growth efficiency, and carcass characteristics in broiler chickens to produce a healthy product. Poultry Science, 104(1): 104392.

Awad, A. L.;Fahim, H. N. and El-Shhat, A. M. 2020. Response of Sudani Ducklings to Dietary Echinacea

purpurea Addition on Growth Performance and Economic Efficiency. Journal of Animal and Poultry Production, 11(5): 175-182.

Awortwe, C.;Bruckmueller, H.;Kaehler, M. and Cascorbi, I. 2021. Interaction of Phytocompounds of Echinacea purpurea with ABCB1 and ABCG2 Efflux Transporters. Molecular Pharmaceutics, 18(4): 1622-1633.

Bagno, O. A.; Shevchenko,S. A.; Shevchenko,A. I.; Prokhorov,O. N. andShentseva,A. V. 2021. Efficiency of Echinacea purpurea extract in growing broiler chickens. Achievements of Science and Technology in Agro-Industrial Complex.

Burlou-Nagy, C.; Bănică, F.; Jurca, T.;Vicaș, L. G.; Marian, E.;Muresan, M. E.and Pallag, A. 2022. Echinacea purpurea (L.)Moench: Biological and pharmacological properties. A review. Plants, 11(9): 1244.

Dehkordi, S. H.;Fallah, V.andDehkordi, S. H. 2020. Enhancement of broiler performance and immune response by Echinacea purpurea supplemented in diet. African Journal of Immunology Research, 7 (1): 1-7.

Duncan, D.B., 1955. Multiple range and multiple F tests. Biometrics, 11:1-42.

El-Sayed Wahdan, A. A.; Ahmed Youssef, F. M.; Mohamed Hassan, M. F. and Khalil, W. F. 2018. Effect of Pidotimod, Astragalus and Eachnicea on Immune Response and Growth Performance of Broiler Chicks. Poult.Fish Wildl. Sci., 6(194): 2.

Gurbuz, E.; Balevi, T.; Kurtoglu, V.; Coskun, B.; Oznurlu, Y.; Kan, Y. and Kartal, M. U. R. A. T. 2010. Effects of Echinacea extract on the performance, antibody titers, and intestinal histology of layer chicks. British poultry science, 51(6): 805-810.

Habibi, H. andFirouzi, S. 2017. Performance, serum biochemical parameters and immunity in broiler chicks fed dietary Echinacea purpurea and Thymus vulgaris extracts. Journal of World's Poultry Research, 7(3), 123-128.

Hashem, M. A.;Neamat-Allah,A. N.;Hammza,H. E.andAbou-Elnaga,H. M. 2020. Impact of dietary supplementation with Echinacea purpurea on growth performance, immunological, biochemical, and pathological findings in broiler chickens infected by pathogenic E. coli. Trop. Anim. Health Prod., 52: 1599-1607.

Krauze, M. 2021. Phytobiotics, a natural growth promoter for poultry. Advanced studies in the 21st century animal nutrition, 8.

Nasir, Z. and Grashorn, M. A. 2009. Echinacea: a potential feed and water additive in poultry and swine production.

Nosrati, M.;Javandel, F.; Camacho, L. M.;Khusro, A. M. E. E. R.;Cipriano, M.;Seidavi, A. and Salem, A. Z. M. 2017. The effects of antibiotic, probiotic, organic acid, vitamin C, and Echinacea purpurea extract on performance, carcass characteristics, blood chemistry, microbiota, and immunity of broiler chickens. Journal of Applied Poultry Research, 26(2): 295-306.

O'neill, W.; McKee, S. and Clarke, A. F. 2002. Immunological and haematinic consequences of feeding a standardised Echinacea (Echinacea angustifolia) extract to healthy horses. Equine Veterinary Journal, 34(3): 222-227.

Rady, W. F.; Sayed, A. B. N. and Abdel-Raheem, H. A. 2023. Effect of dietary supplementation of echinacea and nucleotides on productive performance, intestinal histomorphology and gene expression of broiler chickens. Assiut Veterinary Medical Journal, 69(176): 141-155.

Rahimi, S.;TeymoriZadeh, Z.;Torshizi, K.;Omidbaigi, R. andRokni, H. 2011. Effect of the three herbal extracts on growth performance, immune system,

blood factors and intestinal selected bacterial population in broiler chickens. Journal of Agricultural Science and Technology, 13(4): 527-539.

Ravazzolo, L.;Ruperti, B.;Frigo, M.;Bertaiola, O.;Pressi, G.;Malagoli, M.and Quaggiotti, S., 2022.C3H expression is crucial for methyl jasmonate induction of chicoric acid production by echinaceapurpurea (L.) Moench cell suspension cultures.Int. J. Mol. Sci., 23 (19): 11179.

Ren, W.; Ban, J.; Xia, Y.; Zhou, F.; Yuan, C.;Jia, H. and Wu, H. 2023. Echinacea purpurea-derived homogeneous polysaccharide exerts anti-tumor efficacy via facilitating M1 macrophage polarization. The Innovation, 4(2).

SAS, 2004. Institute SAS/S A User's Guide, Version 9.1. Cary. NC: Inst. Inc.

Shen, C.; Li, S.;Cai, Z.; Man, R. and Wang, X. 2020. Effect of Echinacea purpurea extract given in drinking water on performance, slaughter variables, and meat quality of broilers. ES Food & Agroforestry, 2: 42-49.

Vieira, S. F.; Gonçalves, S. M.; Gonçalves, V. M.; Llaguno, C. P.; Macías, F.; Tiritan, M. E.; and Neves, N. M. 2023. Echinacea purpurea fractions represent promising plant-based anti-inflammatory formulations. Antioxidants, 12(2): 425.

Ye, Y.; Song, Y.; Zhuang, J.; Wang, G.; Ni, J. and Xia, W. 2019. Anticancer effects of echinacoside in hepatocellular carcinoma mouse model and HepG2 cells. J. Cell. Physiol., 234: 1880–1888. https://doi.org/10.1002/jcp.27063.

الملخص العربى

فاعلية إضافة عشبة الأخناسيا إلى علف دجاج التسمين

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تهدف هذه الدراسة إلى القاء الضوء على جدوى استخدام عشبة الأخناسيا في غذاء كتاكيت اللحم وفاعليتها في تحسين الأداء والحالة الصحية. تم توزيع 96 كتكوت تسمين عمر يوم بشكل عشوائي على 4 معاملات غذائية بواقع 3 مكررات لكل معاملة و8 كتاكيت لكل مكررة. استمرت التجربة 42 يومًا. كانت المعاملات الغذائية المقدمة على النحو التالي: المجموعة الأولى كنترول حيث تغذت على العلف الأساسي بدون أي إضافة. بينما المجموعات الثانية والثالثة والرابعة تم اضافة 0.5 و1.0 و1.5٪ على التوالي من الأخناسيا الى العلف. أظهرت النتائج أن إضافة الأخناسيا إلى الغذاء أدى إلى تحسين وزن الجسم وزيادة وزن الجسم المكتسب وتناول العلف ونسبة التحويل الغذائي. أدى إضافة الأخناسيا إلى علائق دجاج التسمين إلى زيادة معنوية ($P \leq 0.05$) في قيم كرات الدم الحمراء وكرات الدم البيضاء والهيموجلوبين والبروتين الكلى والألبومين والجلوبيولين. من ناحية أخرى، انخفضت الدهون الثلاثية والكوليسترول الكلي والكوليسترول الضار (LDL) بينما ارتفعت مستويات الكوليسترول الجيد (HDL). زاد نشاط إنزيمات الكلية المضادة للأكسدة (TAC) والجلوتاثيون بيروكسيديز (GSH-Px)، في حين انخفضت مستويات المالونديالديهايد (MDA). أدت إضافة الأخناسيا إلى زيادة معنوية ($P \leq 0.05$) في نسبة الذبيحة ووزن القلب وطول الأمعاء، بينما قللت من الوزن النسبي للدهون الحشوية في كتاكيت التسمين. علاوة على ذلك، أدت اضافةالأخناسيا وخاصة بنسبة 0.5 و 1.0٪ إلى زيادة الوزن النسبي للطحال والبرسا والغدة التيموسية. سجلت إضافة 0.5٪ من الأخناسيا أعلى إيرادات صافية وكفاءة اقتصادية.

من ذلك نستنتج أنه يمكن إضافة 0.5 ٪ من الأخناسيا بفعالية لعلف كتاكيت اللحم دون أي آثار ضارة. علاوة على ذلك، فإن إضافة 0.5 ٪ من الأخناسيا الى العلف لها تأثير مفيد على الأداء والحالة الفسيولوجية والمناعية والعائد الاقتصادي لكتاكيت اللحم.