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EFFECT OF DIFFERENT LEVELS OF BASIL SEEDS ON SOME BLOOD BIOCHEMICAL TRAITS

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ABSTRACT
This study was designed to evaluate the effect of the different levels of basil seeds (*Ocimum Basilicum*) on blood biochemical values of broilers. Three equal treated groups (100 birds/treatment) with two replicates (50 birds/ replicate) of total 300 straight run (Ross 308) at age one day old chicks were randomly weighed and divided into three dietary treatments: T1 (as control group) birds fed basal diet without any additives. While, T2 and T3 fed diet supplemented daily with 0.3 and 0.6% basil seeds respectively to the end of the experiment (42 days). Blood samples were collected and then analysis. Traits involved in this study were creatinine, total protein, albumin, globulin, glucose, cholesterol, HDL, ALT, AST and ALP concentration. The results indicate that total protein, albumin, globulin were increased significantly in serum blood of chicks were fed on basal diet with 0.3% and 0.6% basil seeds while ALT, AST and ALP and cholesterol were decreased significantly. However, creatinine, glucose, and HDL were not affected by adding 0.3% and 0.6% of basil seeds to basal diets. In conclusion, basil seeds at a level 0.3% and 0.6% led to enhance the blood biochemical parameters and health status of broilers.

KEYWORDS: Poultry, Broilers, Nutrition, Herbs, Basil seeds, Blood biochemical traits.

INTRODUCTION

After the European Union ban the use of antibiotics as growth promoters (AGP) in animal diet, also other countries still permitted the use of antibiotic as (AGP) like the United States. Increment the resistant risk of pathogens to antibiotics and consumers concerns about residues of antibiotic. The United States Department of Agriculture (USDA) showed that do not allow the use of antibiotics as growth promoters or to prevent diseases. Therefore, organic poultry producer's need alternatives to the antibiotics to produce non-antibiotic products (Dibner and Richards, 2005). Plant, herbs, and their extract are an alternative to antibiotics and act as growth promoter feed additives plants (Jamroz and Kamel, 2002; Khattack *et al*., 2014; Cornelison *et al*., 2006; Tiihonen *et al*., 2010; Mathlouthi *et al*., 2012; Hashemipour *et al*., 2013). The beneficial effect of this natural feed additives are health properties of this product including antioxidant (Vichi *et al*., 2001 and Lee *et al*., 2004), antimicrobial (Deans and Ritchie, 1987; Paster *et al*., 1990; Hammer *et al*., 1999), stimulating endogenous digestive enzymes (Lee *et al*., 2004) and increasing digestibility (Mitsch *et al*., 2004; Kroismayr *et al*., 2008), also improving gut health and histology and modifying secretions of digestion (Williams and Losa, 2001; Kreydiyyeh *et al*., 2003; Jamroz *et al*., 2003). Windisch *et al*., 2008; Steiner, 2006; and Periˇc *et al*., 2010 have shown that some phytobiotic act to reduce microbial toxins in addition, reduce inflammation, therefore; protein production may be allocated to growth due to enhancing of immune modulator. Finally, enhancing of health status of broiler (Steiner, 2006; Kroismayr *et al*., 2008). Plants are natural, less toxic and less residue in the poultry product, also Food and Drug Administration (FDA) certified plant and their products as Generally Recognized as Safe (GRAS) (Wang *et al*., 1998). The major active ingredient of basil were (linalool; 3.94 mg/g), (estragole; 2.03 mg/g), (eugenol; 0.896 mg/g), and 1,8-cineole (0.288 mg/g) (Lee *et al*., 2005). The present study was designed to evaluate the effect of different levels of basil seeds as some dietary feed additives to the poultry. The effects of this seeds on creatinine, total protein, albumin, globulin, glucose, cholesterol, HDL, ALT, AST and ALP concentration were determined as an indicator of health status of chicks.

MATERIALS & METHODS

Three hundred day-old straight run broilers chicks (Ross-308) were bought from a commercial hatchery and divided randomly and equally into three treated groups of 100 birds, each treated group was subdivided into 2 replicates of 50 birds per replicate. The first group (T1) was fed daily on diet without basil seeds additive as a control group. Second group (T2) were fed daily on diet with added 0.3% basil seeds and the third group (T3) were fed on diet with 0.6% basil seeds. Birds were management according to (Aviagen, 2009) guide for management and nutrition requirement. Feed and water were provided *ad libitum*. One types of diets (starter was used over the period of experiment (42 days) (Tables 1).

At day 42th of age, blood samples were collected from the bronchial vein in a test tube without anticoagulant from six broilers of each treatment randomly. The blood was allowed to clot and centrifuged for 10 minutes at 3000 rpm to obtain on serum which stored in a deep freeze (-20C^{o}) (Al-Daraji, 2008). Creatinine, total protein, albumin, globulin, glucose, cholesterol, HDL, ALT, AST and ALP concentration were determined by using of diagnostic kit and spectrophotometer. Data generated from experiment

was carried out in a complete randomized design (Steel and Torrie, 1980). These data were subjected to ANOVA according to general linear model procedure of SPSS software (SPSS, 2001). The significant differences among means were determined by Duncan's multiple range tests with ($p \leq 0.05$) level of significance.

TABLE 1: compositions of experimental diets (NRC, 1994)

Ingredient %	Starter diet
Yellow corn	32.5
Soybean meal (48% protein)	30
Wheat	30
Animal protein	5
Sunflower oil	1
Premix	0.5
DL-Methionine	0.1
Lysin	0.1
Dicalcium phosphate	0.8
Total	100
Calculated chemical analysis	
Metabolize energy (kcal/kg)	3020
Crude protein (%)	21.5

RESULT & DISCUSSION

The effect of adding basil seeds on total protein, albumin, globulin and glucose were showed in table (2). Result showed that total protein, albumin, and globulin were improved significantly ($p \leq 0.05$) in T2 and T3 (chicks fed basal diet with 0.3% and 0.6% basil seeds respectively as compared with control group, while glucose was no significant differences ($p \leq 0.05$) among these treated groups. The effect of adding basil seeds on ALT, AST and ALP were showed in table (3). Liver enzymes were decreased significantly ($p \leq 0.05$) in T2 and T3 (chicks fed basal diet with 0.3% and 0.6% basil seeds respectively as compared with control group. Data of cholesterol, high density lipoprotein HDL, and creatinine were presented in table (4). The highest significant ($p \leq 0.05$) decrease of cholesterol was decreased significantly ($p \leq 0.05$), while HDL was decreased significantly ($p \leq 0.05$) in T2 and T3 (chicks fed basal diet with 0.3% and 0.6% basil seeds respectively as compared with control group. However, creatinine was no significant differences ($p \leq 0.05$) among treated groups.

TABLE 2: Effect of different levels of basil seeds on total protein, albumin, globulin, and glucose

Treatment / Parameter	T1 (Control)	T2 (Basil seeds 0.3%)	T3 (Basil seeds 0.6%)
Total protein (mg/DL)	5.09±1.62 c	6.54±1.16 a	6.07±129 b
Globulin (mg/DL)	2.1±0.31 c	2.2±0.53 b	2.6±0.55 a
Albumin (mg/DL)	2.99±1.05 c	4.34±2.11 a	3.27±1.55 b
Glucose (mg/DL)	180.8 ±3.11	187± 2.25	186± 3.17

Small different letters in the same raw denoted that significant differences between treatments at a level ($p \leq 0.05$).

TABLE 3: Effect of different levels of basil seeds on liver enzymes (IU/L).

Treatment / Parameter	T1 (Control)	T2 (Basil seeds 0.3%)	T3 (Basil seeds 0.6%)
ALT	14.92±0.99 c	13.4±1.24 b	12.96±2.28 a
AST	122.6±7.50 c	111.4±8.45 b	102.8±6.57 a
ALP	372.4±22.01 c	306±16.6 b	287.6±22.08 a

Small different letters in the same raw denoted that significant differences between treatments at a level ($p \leq 0.05$).

TABLE 4: Effect of different levels of basil seeds on cholesterol, HDL, and creatinine (mg/DL).

Treatment / Parameter	T1 (Control)	T2 (Basil seeds 0.3%)	T3 (Basil seeds 0.6%)
Cholesterol	233.6 ±10.9 b	179 ±12.12 a	193.2 ±6.29 a
HDL	36.4 ±1.50 a	29.2 ±1.21 b	29 ±1.36 b
Creatinine	0.907 ±0.002	0.865 ±0.004	0.802 ±0.001

Small different letters in the same raw denoted that significant differences between treatments at a level ($p \leq 0.05$).

The increment of total proteins, albumin, and globulin might be due to improving immune response and immunoglobulin production because of total protein is composed from antibodies and albumin. One of the active ingredient in basil is linalool and it`s an intermediate in the manufacture of vitamin E (Özek *et al*., 2010). It acts as suppressed genotoxicity, by radical scavenging activity (Mitić-Culafić *et al*., 2009). The use of antioxidants, especially vitamin E has been proven to reduce harmful peroxidation of lipids and cholesterol in animal models (Singh *et al*., 2005). Therefore, the use of basil seeds may act as antioxidant to protect body cell membrane from damage by free radical. Also, the active ingredient of basil seeds may produce vitamin E which responsible for production of eicosanoids that acts to decrease the incidence of inflammation in poultry (Calder, 1998). Therefore, the use of basil seeds in poultry diets may be decrease the incidence of inflammation and damage cells of organs especially liver and kidney that may minimized the levels of liver enzymes ALT, AST and ALP. The active ingredient of plant oil extract inhibits the activity of hepatic 3-hydroxy-3- methylglutaryl coenzyme A (HMG-CoA) reductase (Crowell, 1999) who has shown that this enzyme is considered a key enzyme in cholesterol synthesis. Our results with agreement with (Abbas, 2010) who reported that the use of basil seeds was led to decrease blood cholesterol significantly.

CONCLUSION

Basil seeds at a level 0.3% and 0.6% led to enhance the blood biochemical parameters especially total protein, and decrease liver enzymes ALT, AST and ALP, also decrease cholesterol.

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