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Impact of Adding Digestrom® and Biotronic®Top3 in Feed of Broilers Infected with *Escherichia Coli*

A Dissertation
Submitted to the Council of the College of Veterinary Medicine at the University of Baghdad in partial fulfillment of the requirements for the Degree of Master of Science in Veterinary Medicine /Poultry Diseases

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Abstract: ***This study was carried out to investigate the effect of Diagestarom and Biotronics® top 3 as feed additives for broiler chickens in all alone and as addition to each other, on body weight, weight gain, food conversion ratio, liver enzymes and immune response to Newcastle disease were investigated. The study effect of these substances as feed additives after the challengewithavian pathogenic Escherichia coli (APEC). The study was carried out by using of 300 chicks fromAl-Shukr hatchery in Baghdad at the age of one day. The experimentchicks were randomly divided from the first day to the five groups, each group containing 60 chicks and were divided as follows: 1- Group 1: Diagestrom used in a dose of 150 g / ton and biotronictop3 1 kg / ton with diet. 2- Group II: Use of Biotronictop3 1 kg / ton.with diet. 3- Group III: Diagestrom used 150 g / ton with diet. 4- IV: control positive group 5- V: control negative group. Blood samples were taken and the serum was isolated for the purpose of measuring Newcastle immunity and liver enzymes.***

Keywords: phytogenic, E. coli, liver enzym

1. Introduction

Escherichia coli is a portion of the usual microflora in the chicken digestive system, but certain strains, such as those nominated as avian pathogenic *E. coli* (APEC), extent into several internal organs and lead to systemic fatal disease colibacillosis, which is characterized by septicemia with numerous organ lesions, usually airsacculitis, pericarditis, perihepatitis, peritonitis and other extraintestinal lesions (Oh, et al., 2011). APEC is considering a most important cause of economic losses due to mortality, morbidity and condemnation of chicke carcasses globally (Ewers et al., 2004; Ahmed and Shimamoto, 2013). There are numerous virulence traits related to the extraintestinal pathogenesis of APEC (Johnson et al., 2008; Ahmed and Shimamoto, 2013).

Biotronic as feed additive are generally supporting the balance of gastrointestinal tract microflora, which is usually seen as an enhancement of the lactobacilli / *E. coli* balance. Biotronic is the acidifier product line of Biomin. The Biotronic product includes products with the main activity in the fields of maintenance and decontamination of grain and feed, progress of digestibility and reducing of microbial growth. The biotronic series differ through the choice of acids (Formic acid 2, 21% and Bropionic acid 5,2%), salts, specific extracts and organic and inorganic carriers (Tabidi, et al., 2016). The carriers are of physiological significance for the poultry and are separated in inorganic (silica and phyllosilica) and organic (periodic oligosaccharides) carriers. Extremely undissociated acids will have an antimicrobial impact in the diet and in the gut of the poultry (Tabidi, et al., 2016).

Digestarom® is a specially formulated phytogenic product designed to improve digestion and diet benefit by mixture exclusive flavoring properties with biologically effective properties. Digestarom® is proper for use in poultry, (www.biomin.net, 2017). Digestarom® improve the palatability of marketable diets, thus enhance feed intake. Furthermore, Digestarom® encourage absorption and utilization of feed nutrients, thus improving digestibility and diet efficiency. (www.biomin.net, 2017).

The greatest predominant diseases in country chickens industry that will infect broiler chickens epidemic be disrupts the liver function. The liver is an important diagnostic organ in broilers is raised and on the other hand, Because of speed up the metabolism in broiler chickens in order to increase production and efficiency, The liver is an significant center involved in the metabolism, and the vital medium of the gastrointestinal tract and the blood has a special importance, And any Liver damage in broiler chickens in the first step, On the nutrition and consequently will effect on the efficiency of chickens (Zareie, 2007). One of the most main tests to estimate liver function is indicators enzymes of liver function (Maass, et al., 2005) .

2. Material and Methods

Estimated the liver enzymes : amino group (ALT) and (AST)

Aspartate and alanine amino transefrase activities were measured by using enzymatic kit .The glutamic transaminase enzymes in serum represents (glutamic oxaloacete AST). And in serum glutamic pyruvic (ALT) catalyze the transfrase of the amino group of glutamic acid to oxalactic and pyruvic acid in reversible reaction. The transaminase activity is proportional to the amount of the oxalate or pyruvate formed over a defined period of time and measured by reaction with 2,4-Dinitrophnylthyrozine (DNPH)in alkaline solution. The liquid reagent react with certain

volume of the sample under defined constant conditions (e.g. temperature, PH, time) and produce a change of color that is proportional to the concentration of substance or activity of enzymes. As the indicator dye changes color the reaction is read spectrophotometrically by light reflectance. This test was done according to instructions of manufactures manual. Component of Aspartate aminotransferase Kit (AST) and (ALT): used to measure the activity of these yeasts commercial Kit (RANDOX) were carried out according to the manufacture's instruction Reitman and Frankel (1957).

Estimate the activity of alkaline phosphatase (ALP):
For the purpose of this estimated the enzyme activity was used several commercial Kit (Bio Merieux)® were carriedout according to the manufacture's instruction Kind and King (1954)and the Kit contains four reagents which as following:

1) Reagent No. 1:- It represent the (Substrate buffer) 56 ml.
2) Reagent No. 2:- It represent the (Inhibitor) 27 ml.
3) Reagent No. 3:- It represent the (Standard) 25 ml.
4) Reagent No. 4:- It represent the (Farb reagent) 27 ml.

All reagents were used directly and kept at temperature (2-8 C°). Examination was conducted by the manufacture and the instruction

3. Results

3.1 Alkaline phosphatase (ALP)

The result of current study showed the presence of a significant differences at level (P<0.05) among all groups in (ALP) before and after challenge.

The higher mean level at day 24 was record in the G1which was 6458 followed by G3, G2, G4 and G5 which were 6240, 5860, 5670 and 5645 respectively.

The higher mean level at day 35 in control groups without challenge was record in G1 which was 6620 followed by G3, G2, G4 andG5 which were 6335, 6130, 5640 and 5530.

On other hand the higher mean level at day 35 in groups with challenge was record in G1 which was 8301 followed by G2, G4, G3 and G5which were 8270, 8220, 8210 and 5215 respectively as shown in (table 1)

Table 1: Result of ALP values (M ± SE) in serum of different groups in different days

The group	Mean ± SE of ALP		
	24 days old	35 days old (-ve)	35 days old (+ve)
Group 1	6458 ± 361 A	6620 ± 261 A	8301 ± 388 A
Group 2	5860 ± 278 AB	6130 ± 359 B	8270 ± 361 A
Group 3	6240 ± 309 A	6335 ± 335 A	8210 ± 382 A
Group 4	5670 ± 261 B	5640 ± 256 C	8220 ± 375 A
Group 5	5645 ± 245 B	5530 ± 260 C	5215 ± 216 B
LSD value	461.79 *	431.84 *	562.09 *
Means having with the different letters in same column differed significantly. * (P<0.05).			

3.2 Alanine Aminotransferase (ALT)

The result of present study show no occurrence of significant differences at level (P<0.05) among all groups in (ALT) level at day 24 and 35 (with and without challenge) as shown in (table 2).

Table 2: Result of ALT values (M ± SE) in serum of different groups in different days

The group	Mean ± SE of ALT		
	24 days old	35 days old (-ve)	35 days old (+ve)
Group 1	8 ± 0.52 A	6 ± 0.42 A	9 ± 0.58 A
Group 2	7 ± 0.36 A	5 ± 0.27 A	8 ± 0.46 A
Group 3	7 ± 0.33 A	5 ± 0.22 A	8 ± 0.46 A
Group 4	6 ± 0.42 A	6 ± 0.36 A	8 ± 0.41 A
Group 5	6 ± 0.31 A	6 ± 0.40 A	8 ± 0.45 A
LSD value	2.58 NS	2.00 NS	2.05 NS
Means having with the similar letters in same column non significantly. NS: Non-significant			

3.3 Aspartate Aminotransferase (AST)

The result of current study proved on occurrence of significant differences at level (P<0.05) among all groups in (AST) level at day 24 and 35 (with and without challenge) as shown in (table 3).

Table 3: Result of AST values (M ± SE) in serum of different groups in different days

	Mean ± SE of AST		
	24 days old	35 days old (-ve)	35 days old (+ve)
Group 1	190	366	449
Group 2	185	353	435
Group 3	181	350	444
Group 4	167	344	420
Group 5	163	340	422
LSD value	62.795 NS	81.06 NS	80.94 NS
Means having with the similar letters in same column non significantly. NS: Non-significant			

4. Discussion

The result of our study are in agreement with (Biswas, et al., 2011) who said , phytogenic additive altered liver enzymes activity positively and had no toxic effect on thekidney and liver as indicated by result of plasma ALT, AST and ALP. Also our result in the same line with (Hammad, 2016) who recorded the presence of significant differences in the liver enzyme after using of diagestarom with water nfor broiler chickens, and had positive protective effect for liver.

In the same line, previous studies have revealed that cinnamon has anti-oxidative, anti-inflammatory and anti-microbial properties (Faix et al. 2009, Stefan et al. 2009, Sang-Oh et al. 2013, Tabatabaei, S.M. et al., 2015). Chang et al. (2001) have also reported that cinnamon extract has anti-bacterial effects against *E. coli, Pseudomonas aeruginosa, Enterococcus faecalis, Staphylococcus aureus, , Salmonella* and *Vibrio parahaemolyticus*(Chang et al. 2001, Griggs & Jacob 2005).

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