

# Impact of Adding Digestrom<sup>®</sup> and Biotronic<sup>®</sup> 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

**Khalid Ali Mohammed<sup>1</sup>, Dr. Sameer Mezher Abdullah<sup>2</sup>**

**Supervisor and Lecturer**

**Abstract:** This study was carried out to investigate the effect of Diagestarom and Biotronics<sup>®</sup> 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 challenge with avian pathogenic *Escherichia coli* (APEC). The study was carried out by using of 300 chicks from Al-Shukr hatchery in Baghdad at the age of one day. The experiment chicks were randomly divided from the first day to the five groups, each group containing 60 chicks and were divided as follows: 1- Group I: Diagestarom used in a dose of 150 g / ton and biotronic top3 1 kg / ton with diet. 2- Group II: Use of Biotronic top3 1 kg / ton. with diet. 3- Group III: Diagestarom 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 enzyme

## 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 chicken 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 Propionic 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<sup>®</sup> is a specially formulated phytogenic product designed to improve digestion and diet benefit by mixture

exclusive flavoring properties with biologically effective properties. Digestarom<sup>®</sup> is proper for use in poultry, (www.biomin.net, 2017). Digestarom<sup>®</sup> improve the palatability of marketable diets, thus enhance feed intake. Furthermore, Digestarom<sup>®</sup> 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 a 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 transferase activities were measured by using enzymatic kit .The glutamic transaminase enzymes in serum represents (glutamic oxaloacetate AST). And in serum glutamic pyruvic (ALT) catalyze the transferase 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-Dinitrophenylthiozine (DNPH) in alkaline solution. The liquid reagent react with certain

Volume 6 Issue 10, October 2017

[www.ijsr.net](http://www.ijsr.net)

Licensed Under Creative Commons Attribution CC BY

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 carried out 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 G1 which 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 and G5 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 G5 which 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 , phytogetic additive altered liver enzymes activity positively and had no toxic effect on the kidney 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).

## References

- [1] Ahmed, A .M. and Shimamoto, T.. (2013). Molecular characterization of multidrug-resistant avian pathogenic *Escherichia coli* isolated from septicemic

- broilers, *Int. J. Med. Microbiol.*, vol. 303 (pg. 475-483).
- [2] **Biswas, A.M.; Ahmed, V.K.; Bharti, and Singah, S.B. (2011).** Effect of anti-oxidants on physio-biochemical and hematological parameters in broiler chicken at high altitude Asian-Aust. J. Anim. Sci. Vol. 24.,2: 246-249.
- [3] **Chang, S.T.; Chen, P.F. and Chang, S.C. (2001).**Antibacterial activity of leaf essential oils and their constituents from *Cinnamomum osmophloeum*. *J. Ethnopharmacol.* 77:123-127.
- [4] **Ewers, C.; Janssen, T.; Kiessling, S.; Philipp, H.C. and Wieler LH, (2004).** Molecular epidemiology of avian pathogenic *Escherichia coli* (APEC) isolated from colisepticemia in poultry. *Vet. Microbiol.* 104:91-101.
- [5] **Faix, S.;Faixová, Z.;Plachá, I. and Koppel, J. (2009).**Effect of *Cinnamomum zeylanicum* essential oil on antioxidative status in broiler chickens. *Acta Vet. Brno* 78:411-417.
- [6] **Griggs, J.P. and Jacob, J.P. (2005).**Alternatives to antibiotics for organic poultry production. *J. Appl. Poult. Res.* 14:750-756.
- [7] **Hammad, S.M., (2016).**Effect of adding different concentration of Digestarom and Levamisol on some immune and productive aspects in broiler. M.Sc. in Poultry Disease. University of Baghdad.
- [8] **Johnson, T. J.; Wannemuehler, Y.; Doetkott, C.; Johnson, S. J.; Rosenberger, S. C. and Nolan, L. K. (2008).** Identification of minimal predictors of avian pathogenic *Escherichia coli* virulence for use as a rapid diagnostic tool, *J. Clin. Microbiol.*, vol. 46 (pg. 3987-3996).
- [9] **Kind, P.N. and King, E.G. (1954).**Colorimetric determination of alkaline phosphatase activity. *J. Clin. Pathol.* 7:322.
- [10] **Maass, N.; J Bauer,;Paulicks, B.;Bohmer, B. and Roth-Maier, D. (2005).**Efficiency of *Echinacea purpurea* on performance and immune status in pigs. *J Anim Phy Anim Nut* 89(7-8): 244-252.
- [11] **Oh, J. Y.; Kang, M. S.; Kim, J. M.; An, B. K.; Song, E. A.; Kim, J. Y.; Shin, E. G.; Kim, M. J.; Kwon, J. H. and Kwon, Y. K..(2011).** Characterization of *Escherichia coli* isolates from laying hens with colibacillosis on 2 commercial egg producing farms in Korea, *Poult. Sci.*, vol.90 (pg.1948-1954).
- [12] **Reitman, S. and Frankel, S. (1957).**Colorimetric method for the determination of serum glutamic pyruvic transaminase. *Am. J. Clin. Pathol.* 28:56-63.
- [13] **Sang-Oh, P.;Chae-Min, R.;Byung-Sung, P. and Jong H. (2013).** The meat quality and growth performance in broiler chickens fed diet with cinnamon powder. *J. Environ. Biol.* 34(1):127-133.
- [14] **Stefan, F.;Zita, F.;Iveta, P. and Juraj, K. (2009).**Effect of *Cinnamomum zeylanicum* essential oil on antioxidative status in broiler chickens. *Acta. Vet. Brno* 78:411-417.
- [15] **Tabatabaei, S.M.; Badalzadeh, R.; Mohammednezhad, GR. and Balaei, R., (2015).**Effects of Cinnamon extract on biochemical enzymes, TNF- $\alpha$  and NF- $\kappa$ B gene expression levels in liver of broiler chickens inoculated with *Escherichia coli*.
- [16] **Tabidi, M.H.;Abeer, S.;Akasha, A.S. and Abbas, O.M. (2016).**Effect of biotronic as acidifier in broiler chicks feed and compare with antibiotic neomycin on performance values, M.Sc. In animal production. Sudan University for Science and Technology.
- [17] **www.biomin.net, 2017.**
- [18] **Zareie, A. (2007).** Effects of husk tomato fruit extract on liver function tests and some blood biochemical factors in male Westar rats, Master Thesis of Islamic Azad University of Kazeroun.