Effect of *E. coli* 0H157 on Baladi Broiler Chicken and some Biochemical studies

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Abstract: Forty Chicken 4 weeks old and 800 - 1000 g average body weight were used. They kept in a balanced diet to study some performance, and clinicopathological changes under *E.coli* 0157:H7 infection. Ten chickens kept as control and 30 were infected with *E. coli* 015,: H7 by dose 0.05m1 (x 10^7 CFU) inoculated intramuscularly. Body weight were recorded, blood samples were collected at 7, 15, 30 days post infection, serum was separated for determination of AST, ALT, Total protein. Albumin, urea, creatinine, calcium phosphorous, sodium, potassium and cortisol hormone. The biochemical analysis showed increase in AST and ALT and a significant change in protein. Hypoalbuminemia, was observed, increase of serum urea, creatinine, hypocalcaemia, hyperphosphatemia, and decrease in level of potassium, sodium and cortisol hormone in areas. Blood examination revealed pancytopenia. This indicates that *E. coli* 0157: H7 causes deleterious effect on the Hematopoietic system.

Key words: *E. coli*; Baladi Broiler Chicken; AST, ALT; Biochemical analysis.

Introduction

Infection with *E. coli* 0157:H7 presents with a wide spectrum of clinical manifestations, including severe abdominal cramps with little or no fever and watery diarrhea that often progresses to grossly bloody diarrhea (Levin, 1997). Infection can be asymptomatic or can present with only nonbloody diarrhea (Belongia et al., 1990). Extraintestinal involvement, including cardiac and neurologic manifestations, has been reported, and infection can be associated with the hemolytic-uremic syndrom and thrombotic thrombocy-topenic purpura. The disease can be fatal (Karmali et al., 1985).

*Escherichia coli* comprises a group of bacteria found in the intestines of humans, animals and birds. *E. coli* 0157:H7 strain produces potent toxins and can cause food born pisones to person transmitted disease after ingestion of very low numbers of microorganism *E. coli* 0157:H7 was first identified as a human pathogen in 1982 (Riley et al., 1983).

Griffin and Tauxe, (1992), a recorded reported that strain of *E. coli* infection is more often reported in the young, illness signs are bloody diarrheae, severe abdominal pain, low grade of fever and vomiting. The major source of food born *E. coli* 0157:H7 ciated disease is undercooked grand beef. Roast beef, roast chicken, raw milk and water an out break of the disease in persons who had eaten fast food in these restaurant chain. Marks and Robert, (1993), reported that the cytotoxins of *E. coli* 0157:H7 production seems to be important factors in the pathogenesis of disease. These cytotoxins are among the most potent bacterial toxins. These toxins in active host cell ribosomes disrupting protein synthesis and causing cell death Obrien et al. (1992).

Prevention of illness is especially critical in addition to strategies designed to prevent food born illness. Controlled production of live animal, meat processing relatively little information is available on clinicopathological changes in experimental animals with this disease. The present work designed to study some serum biochemical changes after experimental infections of chicken with *E. coli* 0157:H7.

2. Material and Methods

*E. coli* strain:

*E. coli* 0157: H7 strain was used for the experimental infection for 40 chicken 4 weeks old as well as 800-1050 gm average body weight. Bird proved to be free from pathogenic bacteria and parasitic infection. I/M with 0.05 * 107cfu colony forming unit ml of viable organisms of *E. coli* 0157:H7.

Blood samples:

Two blood samples were collected from wing vein the first blood sample was collected into dry clean tube containing dipotassium. Ethylene diamine tetracete (EDTA) as anticoagulant to covering out the hematological studies including red blood cells counts (RBCs) hemoglobin, (H) packed cell volume .(PCV), mean corpuscular. Hemoglobin
(MCH) and mean corpuscular hemoglobin concentration (MCHC) were calculated from these hematological parameters according to Jain, (1986).

Second blood samples were collected from wing vein and serum was separated and used for the determination the activity of aspartate aminotransferase. (AST) and alanine aminotransferase (ALT) according to Reitman and Frankel, (1957). Total protein and albumin according to Doumas and Biggs, (1972). Urea according to Sanders, (1980) creatinine was estimated according to Bartels, (1971), calcium was determined according to Sarkar and Chankan, (1967), phosphorous was measured according to Goodwin, (1970), Na, K were determined by atomic absorption. Serum cortisol was analyzed by means of a gammacoat 125 I cortisol radioimmunassay kit according to the method described by Campbell and Coles, (1986). Also at the time of scarification feaces from these birds are cultivated on sorbitol MacConkey agar medium for bacteriological examination according to Ratnam and March, (1986).

Statistical analysis according to Snedecor and Cochran, (1967).

3. Results

Bacteriological results recorded fail to ferment sorbitol can be recognized as colorless colonies. Further confirmation we made by agglutination test with anti-serum against the flagella antigen H7 it give positive results.

In Table (1) there is a significant decrease on body weight at 7, 15, 30 days and mortality rate is increase in the 1" week after infection, signs of infection appears in the form of depression, loss of body weight, bloody diarrhea and ascites.

Table (3) revealed a significant decrease in RBcs count Hb concentrations PCV, MCV, MCH, McHc also TLC such decrease was very highly significant on days 30 of infection (P< 0.01).

In Table (4) there is a significant increase in ALT and AST if compared with control group P < 0.05. Total protein and Albumin showed highly significant decrease if compared with control group. Concerning cortisol the result showed highly significant increase if compared with control group.

Table (5) revealed a significant increases in serum urea and creatinine and Hyperphosphatemia in d15 and d30 .p<0.01.also there is a significant decrease in serum level sodium,potasium and Hypocalcemia in d15 and d30 p<0.01.

Table 1: Changes in body weight in infected baladi chicken with E coli

<table>
<thead>
<tr>
<th></th>
<th>7 days</th>
<th>15 days</th>
<th>30 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>860 ±0.72</td>
<td>880 ± 0.13</td>
<td>1000 ± 0.40</td>
</tr>
<tr>
<td>Infected</td>
<td>800 ± 0.70</td>
<td>700 ± 0.75*</td>
<td>708 ± 0.56**</td>
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</tbody>
</table>

*P<0.05 **P<0.01

Table 2: Composition of the basal diets (according to National Research Council)

<table>
<thead>
<tr>
<th>Ingredients (%)</th>
<th>Started diet</th>
<th>Grower-Finisher diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow corn ground</td>
<td>67.40</td>
<td>72.90</td>
</tr>
<tr>
<td>Soyabean meal (44 %)</td>
<td>21.30</td>
<td>18.30</td>
</tr>
<tr>
<td>Fish meal (72 %)</td>
<td>4.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Meat meal (60 %)</td>
<td>5.84</td>
<td>4.30</td>
</tr>
<tr>
<td>Bone meal</td>
<td>0.08</td>
<td>0.10</td>
</tr>
<tr>
<td>Dicalcium phosphate</td>
<td>0.15</td>
<td>0.10</td>
</tr>
<tr>
<td>Limestone ground</td>
<td>0.79</td>
<td>0.94</td>
</tr>
<tr>
<td>Salt</td>
<td>0.71</td>
<td>0.17</td>
</tr>
<tr>
<td>Methionine</td>
<td>0.12</td>
<td>0.04</td>
</tr>
<tr>
<td>Premix *</td>
<td>0.15</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Calculated analysis

| Crude protein (%) | 2150 | 19 |
| ME (Kcal/kg) | 2989 | 3040 |
| C/P ratio | 139.02 | 160 |

Broiler premix furnishing the following ingredients per kg of feed vit. A 12000 IU, vit D3 2000 IU, Vit E 10 mg, folic acid I mg vit Niacin 20 mg, pantothenic acid 10 mg, vit K 2 mg, vit B1 1mg, vit B2 4 mg, vit B6 1.5 mg vit B12 10 µg, iron 30 mg, copper 10 mg, Zinc 55 mg, Mn 55 mg, Iodine 1 mg, Se 0.1 mg, choline chloride 500 mg.
4. Discussion

Hemorrhagic colitis caused by E. coli 0157:H7 is a clinical syndrome that consists of abdominal cramps; diarrhea that progresses to become bloody; radiologic or endoscopic evidence of clonic mucosal edema, erosion, or hemorrhage; and the absence of conventional enteric organisms in the stool.

The present study shows a significant decrease in RBCs count, Hb concentration and PCV in the affected birds indicate anemia of microcytic hypochromic as showed by the erythrocytic indices that were proportionally correlated with the severity of infection of E. coli. This result is in accordance with Jain, (1986).

The increase in serum AST levels in this work could be due to liver damage produces by the infected bacteria. Campell and Coles, (1986); mentioned that the increased of the activity of AST has been associated with hepatocellular damage in birds.

Concerning ALT in chicken some studies reported elevation of ALT it birds infected with bacteria. (Bokori and karasi, 1969). Our result agrees with Omaima (1987), who observed a significant increase in (AST & ALT; in chicken infected with E. coli. The significant change in total protein and albumin in the present work could be due to liver and kidney damage whic could be associated with bacterial infection.


The increase in Urea and creatinine could be due to the effect of th+ micro-organisms and its Toxin on the kidneys. Our results is completely agree with Pai et al., (1986); Tzipori et al., (1987) and Obrig et al., (1987) who reported increased creatinine, urea level in case of renal disease.

Hypocalcaemia, and. Hyperphosphatemia could be due to decrease calcium resorption by damaged renal tubules and associated with: Hypoalbuminemia as reported by Campell and Coles, (1986); Beer et al . (1985) and Marks and Robert, (1993).

The decrease of potassium and sodium level in serum could be due t renal disease as reported by Campell and Coles, (1986). Also th metabolism of Calcium and Phosphorus is closely linked in the body an hypocalcaemia always accompanied with hyperphosphatemia concernin serum cortisol level, the significant increase of serum cortisol level may t attributed to the activation of Hypothalamus piutitary axis due to stress. Oi result agree with Ghanem, (1986) and Campell and Coles, (1986).

In conclusion infection of chicken with E. coli 0157: H7 injured live, and Kidneys. The change in liver and kidney function were more severe in days of infection.

Acknowledgment

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References