Effect of Force 6® Poultry (Curcumin) on Lipid profile in Broiler chicken in presence of IBD vaccine

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Summary

The aim of this study was to investigate effect of Force 6® Poultry on lipid profile in broiler chicken in presence of IBD vaccine. Two hundred chicks at one day old were divided into four equal groups as: Group 1; 50 day old unvaccinated chicks were given (50 gm/ton) of Force 6® Poultry (curcumin) along the experimental period (35 days), chicks in group 2; were given IBD vaccine in (15-day old) (BURNSINE-2), chicks in group 3 were vaccinated with IBD at (15-day old) and given Force 6® Poultry along time of experimental (with 50 gm/ton). Group 4, 50 chicks were saved as negative control. Blood samples were collected from heart for lipid profile detection and included (cholesterol, triglyceride, high-density lipoprotein HDL, very low density lipoprotein VLDL, low-density lipoprotein LDL). The result of lipid profile showed significant (P<0.05) differences with higher value between groups which were (G2, G4) which did not receive force 6 poultry than group (G1, G3) which received force 6 poultry for (cholesterol, triglyceride, HDL, LDL, VLDL). In conclusion, the Force 6® Poultry had main effect to improve lipid profile of treated groups than these groups untreated.

Keywords: Force 6® Poultry, lipid profile, broiler chicken, IBD vaccine.

Introduction

Force 6® Poultry (curcumin) is an innovative and patented premixture of feed additives ensuring the controlled release of active component curcumin in a bio-available form. Force 6 Poultry is a performance booster designed for high productive animals. The expected effects are an improvement of immunity and a limitation of anti-inflammatory process and oxidative stress which orient metabolism into a protective form. Fatty acids and brain of mice treated with carbon tetrachloride and cyclophosphamide. Oral administration of curcumin significantly lowered the increased peroxidation of lipids in these tissues, produced by these chemicals. Administration of curcumin also significantly lowered the serum and tissue cholesterol levels in these animals, indicating that the use of curcumin helps in conditions associated with peroxide-induced injury, such as liver damage and arterial diseases. Soni and Kuttan (5) examined the effect of curcumin administration in reducing the serum levels of cholesterol and lipid peroxides in ten healthy human volunteers receiving 500 mg of curcumin per day for 7 days significant decrease in the level of serum lipid peroxides, an increase in high density lipoproteins (HDL)-cholesterol, and a decrease in total serum cholesterol were noted. Because curcumin reduced serum lipid peroxides and serum cholesterol, the study of curcumin as a chemopreventive substance against arterial diseases was suggested. Yasni et al. (6) investigated the effects of Curcuma xanthorrhiza on serum and liver lipids, serum HDL cholesterol, apolipoprotein, and liver lipogenic enzymes. In rats given a cholesterol-free diet, Curcuma xanthorrhiza decreased the concentrations of serum triglycerides,
phospholipids, and liver cholesterol and increased the concentrations of serum HDL-cholesterol and apolipoproteins. Also the oxidation of low-density lipoproteins (LDL) plays an important role in the development of atherosclerosis. Atherosclerosis is characterized by oxidative damage, which affects lipoproteins, the walls of blood vessels, and subcellular membranes. Several studies suggest that curcumin inhibits oxidation of LDL (7). Dietary curcuminoids have lipid-lowering potency in high fat diet, probably due to alterations in fatty acid metabolism (8). The aim of this study was to investigate effect of Force 6® Poultry on lipid profile in broiler chicken in presence of IBD vaccine.

**Materials and Methods**

Experimental Designs: The experiment was carried out in the experimental unite of poultry diseases, department of pathology. College of Veterinary Medicine, Baghdad University. Two hundred and twenty, one day old broilers chickens Rose 308 breed were used to carry out this experiment from 1 day to 35 days. At day one, twenty chicks were chosen randomly for blood samples collection. The blood samples were collected for estimation the lipid profile concentrations. The rest two hundred chicks were divided into four equal groups, including three treated groups and one control group, chicks for each group were reared in sterile separated pens under good hygienic condition the control group was reared in separated room. The experimental groups and their treatment were explained as below.

Experimental Groups: Group 1: 50 chicks were give immune modulator from 1-at the end of experiment.(with 50gm/ton). Group 2: 50 chicks were give IBD vaccine in (15-day old) (BURSINE-2). Group 3: 50 chicks were give immune modulator all time of experiment and IBD vaccine at (15-day old). Group 4: 50 chicks as negative control.

Note: challenge test for all groups was done in 28 day old by IBDV in dose (10^{3.4}/TCID50).

Lipid profile: Serum Triglycerides, cholesterol, HDL-C cholesterol and LDL-C cholesterol concentrations were measured enzymatically using (Automatic Biochemical Analyzer system-KENZA 240TX). The test was carried out according to the manufacturer’s assay protocol, the results appear regarding to BioLabo company program. While VLDL cholesterol was calculated according to Fred ward formula: (Triglycerides / 5 = VLDL) (9).

The Statistical Analysis System-SAS (2010) was used to affect of different previous factors on (cholesterol, Tri.G, HDL, VLDL, LDL) study parameters. Chi-square test was used to significant compare between percentage and least significant difference-LSD multiple range tests was used to compare between means in this study (10).

**Results and Discussion**

The results of lipid profile were explained in chicken after 28day of force 6® Poultry feed and vaccinated with IBD vaccine (Bursine-2) as in (Table, 1). A: Cholesterol: The results showed significant (P<0.05) increase by maternally cholesterol concentration (MI) with higher value at (200.80 ± 19.42) than other groups, so significant (P<0.05) difference in (G2-G4) at (158.10 ± 3.95 /172.20 ± 13.73) respectively than (G1-G3) at (111.60 ± 10.94 /118.60 ± 6.60) respectively. B: Triglyceride (Tri. G): The results of (Tri. G) revealed significant (P<0.05) increase in maternally with higher value at (285.40 ± 45.23) than other groups, also significant (P<0.05) difference in (G2-G4) at (171.50 ± 13.96 /157.00 ± 12.30 ) respectively than (G1-G3) at (126.20 ± 11.77 /102.50 ± 13.43) respectively. As well as significant (P<0.05) difference in (G1) at (126.20 ± 11.77) than (G3). C: High-Density Lipoprotein (HDL): The results of (HDL) appeared significant (P<0.05) increase in maternally (MI) with higher value at (104.67 ± 3.77) than other groups, so significant (P<0.05) difference in (G1-G3) at (82.51 ± 10.29 /88.54± 6.56), respectively than (G2-G4) at (60.13 ± 17.75 /61.40 ± 3.54), respectively. D: Very Low-Density Lipoprotein (VLDL): The results of (VLDL) demonstrated significant (P<0.05) increase in maternally with higher value at (57.08 ± 2.86 ) than other groups, as well significant (P<0.05) difference in (G2-G4) at (34.30 ± 2.79 /31.40 ± 2.46 ) respectively than (G1-G3) at (25.24 ± 2.35 /20.50 ± 2.68) respectively. E: Low-
Density Lipoprotein (LDL): The results explained significant (P<0.05) increase in maternally and (G2-G4) with higher value at (38.03 ± 10.42 / 38.90 ± 7.58 /37.48 ± 3.97) respectively than (G1-G3) at (24.20 ± 3.63 / 24.72 ± 6.05), respectively.

Table 1: Effect of difference group in lipid profile (mean ± SD)

<table>
<thead>
<tr>
<th>Group</th>
<th>Cholesterol</th>
<th>Tri.G</th>
<th>HDL</th>
<th>VLDL</th>
<th>LDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI</td>
<td>200.80 ± 19.42 a</td>
<td>285.40 ± 45.23 a</td>
<td>104.67 ± 3.77 a</td>
<td>57.08 ± 2.86 a</td>
<td>38.03 ± 10.42 a</td>
</tr>
<tr>
<td>G1</td>
<td>111.60 ± 10.94 c</td>
<td>126.20 ± 11.77 c</td>
<td>82.51 ± 10.92 b</td>
<td>25.24 ± 2.35 c</td>
<td>24.20 ± 3.63 b</td>
</tr>
<tr>
<td>G2</td>
<td>158.10 ± 3.95 b</td>
<td>171.50 ± 13.96 b</td>
<td>60.13 ± 17.75 c</td>
<td>34.30 ± 2.79 b</td>
<td>38.90 ± 7.58 a</td>
</tr>
<tr>
<td>G3</td>
<td>118.60 ± 6.60 c</td>
<td>102.50 ± 13.43 d</td>
<td>88.54 ± 6.56 b</td>
<td>20.50 ± 2.68 d</td>
<td>24.72 ± 6.05 b</td>
</tr>
<tr>
<td>G4</td>
<td>172.20 ± 13.73 b</td>
<td>157.00 ± 12.30 b</td>
<td>61.40 ± 3.54 c</td>
<td>31.40 ± 2.46 b</td>
<td>37.48 ± 3.97 a</td>
</tr>
</tbody>
</table>

Different letters appear: Significant differences among means in column.

The present study revealed that curcumin possesses hypolipidemia effect manifested by significantly decrease of lipid serum cholesterol (Fig. 1), Tri.G (Fig. 2), LDL (Fig. 3), and VLDL (Fig. 4), as compared with control. As well as curcumin had elevated effect on HDL-C (Fig. 5), when compared with curcumin free groups, (11) demonstrated the normal value of Serum lipids (triglyceride, cholesterol, HDL-C cholesterol, LDL-C cholesterol, and VLDL) in clinically healthy broilers ostriches. The results were as follows:
the mean±SD of triglyceride, cholesterol, HDL-C, LDL-C, and VLDL in broiler serum was (190±82, 183±46, 118±24, 24±8, and 38±16 mg/dl), respectively. The serum lipid values showed highly significant difference between broilers and ostriches, this result matched other results like (12). Who explained that Curcumin significantly (p<0.05) reduced triglycerides at 1.5% and 2.5% and cholesterol and LDL at 2.5%. Similarly, the graded curcumin powder (0.05 to 0.20%) significantly decreased serum triglyceride, total cholesterol, and LDL but increased HDL in laying hens at 104 weeks of age (13). Moreover, it has been reported that hens (28 wk) fed curcumin at 1.0% significantly decreased yolk total lipid by 13.95% (14). However, recent study showed a significant reduction of triglycerides with no effects on other lipid parameters in subjects treated with curcuminoids (1 g/day) (15). As well, (16) demonstrated that increase in serum concentration of total cholesterol was not modified by exogenous antioxidants, increased level of high-density lipoprotein cholesterol (HDL-C) in serum of hypothyroid rats was further enhanced by vitamin E and curcumin. Moreover, a significant elevation in mitochondrial lipid peroxidation and protein carbonylation was noticed in hypothyroid groups treated with vitamin E and curcumin. Moreover (17) explained that the bile duct epithelial fold length was significantly increased (P<0.01) in broiler chickens fed curcumin. Curcumin has been known to produce hyperplasia of bile duct muscles and increase bile flow output. But some studies have watched the contrary results (18) showed the curcumin concentration was greater after capsule than powder administration. Consumption of either dose of curcumin did not significantly affect triglycerols, or total, LDL, and HDL cholesterol over 1 month or 6 months. However, the concentrations of plasma curcumin and serum cholesterol were positively and significantly correlated. Curcumin consumption does not appear to have a significant effect on the serum lipid profile, unless the absorbed concentration of curcumin is considered, in which case curcumin may modestly increase cholesterol. In general this discrepancy with our study and others may explain the variation among the experimental units or the source of curcumin. The significant reduction of serum lipids clearly indicated the hypolipidemic affects of curcumin which was dose-dependent due to the production of hyperplasia of bile duct muscles and the increase of bile flow output also alterations in fatty acid metabolism.

References

تأثير القوة 6% للدواجن على ملف الدهون في دجاج اللحم يوجد لقاح التهاب الجربان المعدي

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الخلاصة

استعمل في التجريبة 200 فرخة بعمار يوم واحد قسمت الى اربع مجموعات متساوية بواقع خمسين فرخة جمعها من عمر يوم الى نهاية التجربة (35 يوم).

(المجموعة الأولى): 50 فرخة أعطيت القوة 6 للدواجن بجرعة (50- الغاز للطن) من عمر يوم الى نهاية التجربة (35 يوم).

(المجموعة الثانية): 50 فرخة أعطيت لقاح الكمبور (بورسين-2) بعض 14 يوم. (المجموعة الثالثة): 50 فرخة أعطيت القوة 6 للدواجن بجرعة (50- الغاز للطن) من عمر يوم الى نهاية التجربة (35 يوم).

(المجموعة الرابعة): 50 فرخة كمجموعة مسيلة، ملف الدهون شمل (الكلستورول، الدهون الثلاثية، البروتينات الدهنية عالى الكثافة). فضلاً في حالة وراثية يمكن تقليل الكبدة، البروتينات الدهنية منخفضة الكثافة (LDL) البروتينات الدهنية منخفضة الكثافة (HDL) أظهار اكتشاف مفعول مع قيماً أعلى بين المجموعات التي كانت للفحوصات 2 و 4 التي تلقي القوة 6 للدواجن من المجموعات 3 التي تلقيت القوة 6 للدواجن لكل من (الكلستورول، الدهون الثلاثية، البروتينات الدهنية عالى الكثافة) ملاحظة عامة. البروتينات الدهنية منخفضة الكثافة (LDL) البروتينات الدهنية منخفضة الكثافة (HDL) أظهار اكتشاف مفعول مع قيماً أعلى بين المجموعات التي كانت للفحوصات 2 و 4 التي تلقيت القوة 6 للدواجن. ثبت أن الدواجن التي تلقيت القوة 6 للدواجن، ملف الدهون، دجاج اللحم، لقاح التهاب الجربان المعدي.