Original Research Article

Effect of dietary supplementation of Ajwain (*TrachyspermumAmmi*) seed powder on serum biochemical parameters of Pratapdhan chicken

ABSTRACT

Aim: The purpose of the present ~~research study is was~~ to evaluate the impact of Ajwain supplementation on the serum biochemical parameters of Pratapdhan chicken breeder.

Study Design: Descriptive Study

Place and Duration of Study: Department of Livestock Production and Management, Sri Karan Narendra Agriculture University, Jobner, between August 2016 to April 2017.

Methodology: A totally randomized strategy was used to disperse 120 Pratapdhan chicks. The chicks were distributed into four treatment groups, ~~and which~~ each one contained 30 chicks. The treatment groups included the control (basal diet), T1 (basal diet + 0.1% Ajwain seed powder), T2 (basal diet + 0.2% Ajwain seed powder), and T3 (basal diet + 0.3% Ajwain seed powder). Daily records of the shed's temperature and humidity were used to calculate the Temperature Humidity Index (THI). During the experimental period, standard feeding practices and all other management techniques were used. One bird from each replicate was slaughtered on ~~days~~ 2, 4, 6, and 8 week of the experiment to estimate serum biochemical parameters. The experiment lasted 8 weeks.

Results: A significant difference (P<0.05) was observed in ~~glucose, total protein, cholesterol,~~ calcium, phosphorus, and magnesium values, among the biochemical indicators that varied between the treatment groups and the control group at whole tested period except the calcium concentration at 8 weeks of periods was not significantly (P>0.05) difference. Cholesterol value was observed (P<0.05) significantly decreasing with Ajwain supplementation groups when compared to control group.

Conclusion: Dietary inclusion of Ajwain seed powder ~~is~~ had not negative effect on ~~quite effective in improving~~ the serum bio-chemical parameters of Pratapdhan **~~broilers~~ broiler breeders** and lowering cholesterol ~~levels~~ concentration, which directly affects humans who consume poultry meat.

Keywords: Pratapdhan, feed additive, Ajwain seed powder, bio-chemical parameter.

1. INTRODUCTION

Over the past few decades, the production of commercial poultry has seen an incredible increase in the broiler sector. Broiler meat is readily available, inexpensive, and a good source of animal

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origin protein, with no societal taboos [1]. In poultry rearing, feed comprises the majority of the overall costs, accounting for 80% of total expenditure. Feed additives are a class of nutrient and non-nutrient-rich substances that aid in improving feed utilisztation and, as a result, lowering the high cost of feed. The effectiveness of feed conversion and the benefit-to-cost ratio have been positively impacted by antimicrobial growth promoters in animal diets for a long time. However, feed additives use to ~~would~~ modify the normal gut microbiota, generate residues in meat and eggs, and promote the growth of antibiotic resistant microorganisms, in addition to raising production costs. Therefore, natural growth promoters such as prebiotics, probiotics, symbiotic, enzymes, plant extracts, etc. can be used to replace them without negatively affecting the performance of the birds [2]. As a result, there has been a paradigm shift away from chemical growth boosters and towards phytogenic growth promoters, which employ herbal ingredients. Scientists' interest in herbal feed additives as a resource for increasing production has grown during the past 10 years. Herbs may be employed as feed additives due to their adaptability and preference, reduced toxicity risk, lack of meat residue, lower manufacturing cost, less health risks, and environmentally friendly nature [3]. Additionally, the phenols and other active components assist in lowering the parasite load, which has an impact on health and performance. Ajwain (*Trachyspermumammi L.*) is a fragrant, grassy, annual medicinal plant of the Apiaceae (Umbelliferae) family. The major Ajwain growing states in India are Rajasthan, Gujarat, and Madhya Pradesh. Ajwain is commonly considered a digestive aid as well as an antibacterial for gas, flatulent colic, atonic dyspepsia, and diarrhoea [4]. According to research [5], Ajwain has the ability to suppress platelet aggregation as well as have antifungal and blood pressure-lowering properties [6].Taking the foregoing facts into account, the present study was designed to investigate the effect of Ajwain supplementation in poultry diets on the serum biochemical ~~profile~~ measurementsof the Pratapdhan~~breed of chicken~~chicken breeders.

2. MATERIAL AND METHODS

The study was carried out at the poultry farm of the S.K.N. College of Agriculture at Jobner, Rajasthan (India). The 120-day-old Pratapdhan chicks were purchased from MaharanaPratap University of Agriculture and Technology, Udaipur, under the "Aangan me MurgiPalan" initiative supported by the RashtriyaKrishiVikasYojana. The chicks were distributed randomly into four treatment groups, containing 30 chicks each. Each treatment was reproduced three times with 10 birds per replicate using a completely random design (CRD). The good quality Ajwain seed was purchased from the local market in one slot. The seeds were ground into a fine powder and appropriately included in diet with different levels as specified for various treatments. The ~~T1~~ 1st group~~group~~ served as the control group and received the standard chick ration as per BIS (2007) specifications without any supplements. The inclusion levels of Ajwain seed powder in diets T1, T2, and T3 were 0.1, 0.2, and 0.3 %, respectively. The experiment was prolonged until 8 weeks~~ of age.~~ During the experimental period, food and water were freely given to the broilers. The chicks were raised during the experimental period using standard management strategies, including feeding, watering, and disease prevention. All chicks were kept under the same environmental and hygienic conditions.

2.1 Collection of Blood Sample: The blood was collected at 2, 4, 6, and 8 weeks of the experiment period. Blood samples were evaluated at the Disease Diagnostic Lab, Jaipur. For blood collection, birds were randomly selected from each replication of each treatment. The blood was taken from the wing veins using sterile~~,~~ disposable syringes. The blood was immediately transferred into a series of sterile plastic tubes without an anticoagulant. For serum separation, the test tubes were kept in a slanting position. The serum was centrifuged to eliminate any erythrocytes that were present. Then, the clear, non-haemolyzed sera was collected in clean~~,~~ and dry vials with labels. Glucose, protein, total cholesterol, and other bio-chemical parameters were examined.

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2.2 Blood sample analysis: Transasia Biomedical Limited kits were used with a fully automated Random Access Clinical Chemistry Analyzer (EM 200TM Erba Mannheim, Germany) to evaluate biochemical parameters. .....

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2.3 Statically analysis: A statistical method using analysis of variance (ANOVA) was used for the analysis of data obtained from different experiments. The SPSS package (SPSS 16.0 for Windows, SPSS Inc., USA) was used to compare the results with Tukey at the P≤< 0.05 level of significance, following the procedure of Snedecor and Cochran [7]

3. RESULTS AND DISCUSSION

The results of various serum biochemical parameters of Pratapdhan chicken breeders at 2 weeks of tested period performed by biochemistry auto analyzer are represented in Table 1. The mean values of serum glucose, total protein, calcium, phosphorus, and magnesium were showed significantly (P<0.05) results ranging from 210.10 (C) to 214.94 (T3) mg/dl~~,~~;2.81 (C) to 3.10 (T3) g/dl~~,~~;7.18 (C) to 7.64 (T3) mg/dl~~,~~;3.14 (C) to 3.31 (T3) mg/dl~~,~~;and 2.79 (C) to 2.99 (T3) mg/dl, respectively. However, mean values of cholesterol were significantly (P<0.05) decreased with ~~an increased level of~~0.2 and 0.3%Ajwain seed powder ~~in the chicken diet~~groups. Serum SGPT, SGOT, total bilirubin, urea, and creatinine levels were found to be non-significant.

Table 1 : Effect of Ajwain seed powder supplementation on serum biochemical parameters of Pratapdhan~~broiler~~ breedsat 2 weeks of ~~age~~ experimental period

~~Weeks~~Items	C	T1	T2	T3	P value
SGPT (IU/L)	8.03±0.27	9.22±0.24	9.75±0.44	10.47±0.42	
SGOT (IU/L)	250.83±0.64	251.32±0.83	252.81±0.75	252.82±0.78	
Total bilirubin (mg/dl)	0.058±0.0016	0.051±0.005	0.0497±0.0005	0.0496±0.002	
Urea (mg/dl)	2.46±0.025	2.42±0.027	2.40±0.026	2.31±0.063	
Creatinine (mg/dl)	0.226±0.0007	0.224±0.0009	0.223±0.001	0.221±0.003	
Glucose (mg/dl)	210.10 ± 0.78^{b}	211.52 ± 0.61^{ab}	212.49 ± 0.71^{ab}	214.94 ± 0.69^{a}	
Total protein (g/dl)	2.81 ± 0.05^{b}	2.88 ± 0.048^{ab}	2.93 ± 0.046^{ab}	3.10 ± 0.08^{a}	
Cholesterol (mg/dl)	113.36 ± 0.85^{a}	111.61 ± 0.61^{ab}	110.44 ± 0.80^{bc}	108.94 ± 0.88^{c}	
Calcium (mg/dl)	7.18 ± 0.051^{c}	7.27 ± 0.037^{bc}	7.44 ± 0.041^{b}	7.64 ± 0.66^{a}	
Phosphorus (mg/dl)	3.14 ± 0.026^{c}	3.18 ± 0.023^{bc}	3.23 ± 0.018^{b}	3.31 ± 0.067^{a}	
Magnesium (mg/dl)	2.79 ± 0.028^{c}	2.86 ± 0.027^{bc}	2.92 ± 0.026^{ab}	2.99 ± 0.033^{a}	

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C: control diet group; T1: basal diet+0.1%Ajwain group; T2: basal diet +0.2%Ajwain group; T3: basal diet+ 0.30%Ajwaingroup

(n = 6) Means bearing different superscripts, differ significantly (P≤<0.05) row wise.

~~Each~~ The mean values of various serum biochemical parameters of Pratapdhan chicken at 4 weeks of experimental period are depicted in Table 2. Serum SGPT, SGOT, total bilirubin, urea, and creatinine had non-significant (P>0.05) results~~,~~ however, serum glucose, total protein, cholesterol, calcium, phosphorus, and magnesium had significant (P<0.05) results. The mean value of serum glucose, total protein, calcium, phosphorus, and magnesium ranged from 222.46 (C) to 225.50 (T3) mg/dl~~,~~; 3.09 (C) to 3.29 (T3) g/dl~~,~~; 8.17 (C) to 8.52 (T3) mg/dl~~,~~; 3.81 (C) to 4.12 (T3) mg/dl, and 2.98 (C) to 3.12 (T3) mg/dl, respectively. However, mean values of cholesterol

were significantly (P<0.05) decreased, ranging from 125.64 (for C) group to 122.31 (for T3)tested group, respectively. with an increased level of Ajwain seed powder in the chicken diet.

Table 2 : Effect of Ajwain seed powder supplementation on serum biochemical parameters of Pratapdhan chicken breeders at 4 weeks of experimental periodage

WeeksItems	C	T1	T2	T3	P value
SGPT (IU/L)	11.31±0.18	11.83±0.37	12.54±0.30	12.88±0.22	
SGOT (IU/L)	262.50±0.88	263.20±0.75	263.48±0.73	263.85±0.75	
Total bilirubin (mg/dl)	0.066±0.008	0.0557±0.003	0.053±0.001	0.051±0.0027	
Urea (mg/dl)	10.16±0.36	10.09±0.29	9.94±0.17	9.46±0.24	
Creatinine (mg/dl)	0.224±0.0007	0.223±0.0009	0.217±0.004	0.216±0.003	
Glucose (mg/dl)	222.46±0.61^{b}	223.10±0.60^{ab}	223.78±0.26^{ab}	225.50±0.59^{a}	
Total protein (g/dl)	3.09±0.034^{b}	3.15±0.041^{ab}	3.24±0.053^{ab}	3.29±0.035^{a}	
Cholesterol (mg/dl)	125.64±0.51^{a}	125.60±0.49^{ab}	123.81±0.57^{b}	122.31±0.45^{b}	
Calcium (mg/dl)	8.17±0.033^{b}	8.24±0.031^{b}	8.40±0.052^{a}	8.52±0.035^{a}	
Phosphorus (mg/dl)	3.81±0.036^{c}	3.87±0.025^{bc}	3.96±0.027^{b}	4.12±0.052^{a}	
Magnesium (mg/dl)	2.98±0.049^{b}	3.03±0.020^{ab}	3.07±0.034^{ab}	3.12±0.023^{a}	

C: control diet group; T1: basal diet+0.1%Ajwain group; T2: basal diet +0.2%Ajwain group; T3: basal diet+ 0.30%Ajwaingroup

(n = 6) Means bearing different superscripts, differ significantly (P≤0.05) row wise.

Table 3 is describesd the mean values of serum biochemical parameters of Pratapdhanchicken breedersat 6 weeks of ageexperimental period. At 6 weeks of age,The significant results (P<0.05) were observed for serum urea, creatinine, glucose, total protein, cholesterol, calcium, phosphorus, and magnesium with an increased level of Ajwain seed powder in the poultry diettested poultry groups. The mean value ranges from 227.62 (C) to 230.85 (T3) mg/dl for serum glucose, 3.54 (C) to 3.71 (T3) g/dl for total protein20.47(T3) to 22.11(C)mg/dl for urea, 0.205 (T2) to 0.221(C) mg/dl for creatinine,127.99(T3) to 131.14(C)mg/dl for cholesterol,10.26 (C) to 10.65 (T3) mg/dl for calcium, 4.45 (C) to 4.75 (T3) mg/dl for phosphorus, and 3.12 (C) to 3.25 (T3) mg/dl for magnesium, respectively. However, meanMean values of cholesterol were significantly decreased with increased levels of Ajwain in chicken diets., ranging from 131.14 (C) to 127.99 (T3) with increased levels of Ajwain in poultry feeding. The non-significant results (P > 0.05) were observed for serum SGPT, SGOT, and total bilirubin, urea, and creatinine with different testedlevels of Ajwain in poultry dietspoultry groups.

Table3 :Effect of Ajwain seed powder supplementation on serum biochemical parameters of pratapdhan chicken at 6 weeks of experimental periodage

WeeksItems	C	T1	T2	T3	P value
SGPT (IU/L)	17.78±0.22	18.35±0.28	18.57±0.45	19.70±0.28	
SGOT (IU/L)	291.96±0.78	292.41±0.58	293.01±0.41	293.72±0.81	
Total bilirubin (mg/dl)	0.078±0.071	0.076±0.072	0.075±0.00	0.070±0.008	
Urea (mg/dl)	22.11±0.48^{a}	21.44±0.40^{ab}	21.13±0.30^{ab}	20.47±0.38^{b}	
Creatinine (mg/dl)	0.221±0.002^{a}	0.218±0.002^{ab}	0.205±0.002^{b}	0.213±0.004^{b}	
Glucose (mg/dl)	227.62±1.69	229.69±1.27	229.89±1.06	230.85±1.24	
Total protein (g/dl)	3.54±0.12	3.59±0.17	3.64±0.95	3.71±0.085	
Cholesterol (mg/dl)	131.14±.14^{a}	129.81±0.54^{ab}	128.98±1.85^{ab}	127.99±0.77^{b}	
Calcium (mg/dl)	10.26±0.062^{c}	10.34±0.037^{bc}	10.47±0.053^{ab}	10.65±0.059^{a}	
Phosphorus (mg/dl)	4.45±0.40^{c}	4.53±0.036^{bc}	4.61±0.040^{ab}	4.75±0.048^{a}	

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Magnesium (mg/dl)	3.12±0.009[b]	3.16±0.020[b]	3.20±0.016[ab]	3.25±0.028[a]

C: control diet group; T1: basal diet+0.1%Ajwain group; T2: basal diet +0.2%Ajwain group; T3: basal diet+ 0.30%Ajwaingroup

(n = 6) Means bearing different superscripts, differ significantly (P≤<0.05) row wise.

The results of the serum biochemical parameters of Pratapdhanchicken breedersat 6 8weeks of age experimental periodare described illustratedin Table 4. There was a significantly (P<0.05) difference in the serum glucose, total protein, cholesterol, calcium, phosphorus, and magnesium values among treatment groups, while the serum SGPT, SGOT, total bilirubin, urea, and creatinine, glucose, and calcium showed not significantly (P>0.05) differences among the treatment groups. The mean value of serum glucose, total protein, calcium, cholesterol, phosphorus, and magnesium ranged from 236.07 (C) to 237.89 (T3) mg/dl,3.76 (C) to 3.97 (T3) g/dl, 131.89 (T3) to 135.97(C) mg/dl, 12.24 (C) to 12.65 (T3) mg/dl, 4.79 (C) to 5.07 (T3) mg/dl, and 3.22 (C) to 3.47 (T3) mg/dl, respectively. However, mean values of cCholesterol values were significantly (P<0.05) decreased, ranging from 135.97 (C) to 131.89 (T3), with an increased supplemented level of Ajwain seed powder in the chicken diet.

Table 4 : Effect of Ajwain seed powder supplementation on serum biochemical parameters of Pratapdhan chicken at 8 weeks of experimental periodage

WeeksItems	C	T1	T2	T3	P value
SGPT (IU/L)	20.71±0.48	20.67±0.22	20.67±0.28	21.12±0.29	
SGOT (IU/L)	312.24±0.77	312.30±0.65	312.64±0.69	312.72±0.67	
Total bilirubin (mg/dl)	0.121±0.005	0.120±0.006	0.110±0.007	0.107±0.004	
Urea (mg/dl)	31.54±0.58	31.51±0.96	31.01±0.64	30.17±0.35	
Creatinine (mg/dl)	0.215±0.002	0.209±0.003	0.204±0.001	0.203±0.002	
Glucose (mg/dl)	236.07±071	236.92±0.82	237.77±0.59	237.89±0.78	
Total protein (g/dl)	3.76±0.16[b]	381±0.13[ab]	3.89±0.080[ab]	3.97±0.037[a]	
Cholesterol (mg/dl)	135.97±0.59[a]	134.30±0.94[a]	132.56±0.43[b]	131.89±0.36[c]	
Calcium (mg/dl)	12.24±0.12	12.38±0.13	12.57±0.11	12.65±0.08	
Phosphorus (mg/dl)	4.79±0.052[c]	4.86±0.037[bc]	4.98±0.040[ab]	5.07±0.056[a]	
Magnesium (mg/dl)	3.22±0.036[b]	3.26±0.06[b]	3.34±0.034[b]	3.47±0.046[a]	

C: control diet group; T1: basal diet+0.1%Ajwain group; T2: basal diet +0.2%Ajwain group; T3: basal diet+ 0.30%Ajwaingroup

(N = 6) Means bearing different superscripts, differ significantly (p≤<0.05) row wise.

Dietary supplementation with natural herbal drugs showed no significant (P>0.05) effect on SGOT, SGPT, blood glucose, protein, or urea [8]. Moreover, Nno significant difference (P > 0.05) was observed in blood proteins, albumin, globulin, the A:G ratio, glucose, SGPT, and SGOT in the serum of broiler chicken supplemented with different levels of probiotics [9]. However, compared to the control groups, the probiotic-supplemented (….) birds had a significantly (P<0.05) reduced in serum cholesterol levelconcentration. Furthermore, Ajwain supplementation decreased blood cholesterol and improved HDL levels values in …. [10]. *Trachyspermumammi*methanolic and petroleum ether extracts at 2 g/kg body weight were as effective as simvastatin in treating hyperlipidemia in albino rabbits. The mechanism of lipid transformation might be the cholestatic activity of Ajwain in the liver via increased elimination or degradation of lipoproteins or hepatic suppression of HMG-CoA reductase. Thus, a decrease in

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LDL cholesterol ~~level~~ valueand an increase in HDL cholesterol value can be associated with the therapeutic advantages of Ajwain [11]. Demir et al. [12] revealed that supplementation of thyme powder at 1 g/kg in the broilers' basal feed did not ~~result in~~ significantly (P>0.05) changes in plasma total protein, albumin, total cholesterol, triglyceride, AST, or ALT levels. The results of blood glucose, total serum protein, serum albumin, serum globulin, A:G ratio, AST, ALT, and ALP in the blood birds did not significantly differ (P > 0.05) between the control and enzyme-treated groups [13]. Additionally, supplementing broilers' diets with herbal ingredients significantly (P<0.05) decreased their blood triglyceride and cholesterol levels and elevated their humoral response to the Newcastle disease vaccine [14]. Furthermore, the presence of compounds in Ajwain such as carvacrol and thymol is a major component responsible for lowering cholesterol levels in chicken blood.

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4. CONCLUSION

The serum biochemical parameters indicates that Ajwain seed powder has the ability to significantly ~~improve~~ affecttotal protein, and serum minerals including calcium, phosphorus, and magnesium, which enhance immune system response~~, when added to of~~Pratapdhan broiler breeders. ~~feed.~~ Additionally, supplemented Ajwain seeds powder in~~ing~~ poultry' diets ~~with Ajwain seed powder also s~~significantly decreased in their blood ~~triglyceride and~~ cholesterol ~~levels~~concentration. As a result, Ajwain can be marketed as ~~non antibiotic~~natural growth promoter in the broiler ~~industry~~diets.

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