

Comparative Effect of Herbal Compounds on Productive Performance and Liver Enzymes of Broilers

Urooj Sheikh², Naqash Khalid^{1*}, Muhammad Fiaz Khan², Samman Sajjad², Aisha Bakhtiar Mohsin Ali², Muhammad Sohail³, Sadia Tabassum² and Muhammad Ayaz¹

¹Poultry Research Institute Jaba, Khyber Pakhtunkhwa, Pakistan

²Department of Zoology, Hazara University, Mansehra, Pakistan

³Veterinary Research and Disease Investigation Center Abbottabad, Khyber Pakhtunkhwa, Pakistan

*Corresponding Author: Naqash Khalid, Poultry Research Institute Jaba, Khyber Pakhtunkhwa, Pakistan.

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Abstract

Objectives: The objective of my study was to examine the comparative effect of herbal compounds on productive performance of broilers, optimize the dose of the Herbal compounds and to find the comparative effect of Herbal compounds on liver enzymes of the broilers.

Materials and Methods: The treatments for the experiment were consisted of 3 groups, Group A, Group B and Group C. There were 60 birds in each group and these groups were further replicated into 3 subgroups having 20 birds in each subgroup. Group A was considered as our control group and was provided with fresh water and feed. Group B was administered with herbal compound Livol about 0.5 ml/L of water. Group C was administered with herbal compound Livotal about 0.25 ml/L of water.

Results: Results showed that feed and water intake of all the groups was significant ($P < 0.05$) in first 3 weeks while insignificant ($P > 0.05$) in 4th and 5th week. Control group A consumed more feed and water as compared to other groups, administered with herbal compounds. Body weight was recorded significant ($P < 0.05$) at first 3 weeks while non-significant ($P > 0.05$) at 4th and 5th week. Group B gained more body weight as compared to other groups. FCR was significant ($P < 0.05$) at first to 3rd week while non-significant ($P > 0.05$) at 4th and 5th week. Group B showed better feed conversion ratio. Serum Alanine Aminotransferase (ALT) and Alkaline Phosphatase (ALP) concentration was significant ($P < 0.05$) at 3rd week while non-significant ($P > 0.05$) at 4th and 5th week. Serum ALT and ALP concentration in group B showed was closer to the standard. According to results dressing percentage of Group B was higher than other two groups. Highest mortality was recorded in control group than other two groups.

Conclusion: From the recorded data we conclude that herbal compounds that were used in the experiment, decreased the feed intake while increased body weight gain as compared to control group. Herbal compounds have positive impact on liver enzymes activity for proper liver functioning as compared to control group.

Keywords: Broiler; Herbal Compounds; Livol; Livotal; Feed Conversion Ratio (FCR); Alanine Aminotransferase (ALT); Alkaline Phosphatase (ALP); Carcass Percentage

Introduction

Poultry production till 1964 was a household industry in Pakistan. PIA Shaver, in 1964 sets the basis of commercial poultry production through introduction of new and enhanced breeds of layers and broiler chickens and by Lever Brothers with the production of poultry feed on modern scientific ways of poultry feed production. The Government has excluded this sector from sales tax and income tax, and also permitted the export of day old chicks, broilers and table eggs on minimum prices [1]. Present day poultry meat market is commanded exclusively by cost competitiveness, this has been profoundly changed the market into one similarly overwhelmed by cost and quality seriousness [2]. In commercial poultry production, the broiler industry has gained a tremendous growth over the past few decades. The broiler meat is easily available cheaper and desired protein source of animal origin without any religious taboos. Several feeding strategies and formulation have been tried on commercial scale to improve the performance and viability of promoters [3].

The most costly aspect in poultry production is the nutrition, thusly to lessen the expenses of raising, one ought to improve the effectiveness. There is one approach to achieve the best utilization of feed added substances is the use of growth promoters in poultry sustenance. To invigorate development and ensure the wellbeing of poultry and to keep up the greatest potential growth promoters are utilized so that poultry consume less nutrition [4]. Feed added substances are non-nutritive substances utilized in poultry feed including antioxidants, enzymes, antioxidants, pellet binders, antifungal, shaded pigments and flavored agents. Feed added substances are commonly used to improve feed admission and to expand the growth rate in broiler chicken. For a long time feed added substances have been broadly used to build animal performance and in recent times it is used in poultry industry to improve growth, feed proficiency and layers performance [5].

Antibiotic growth promoters (AGP) have made a colossal commitment to the benefit of the poultry business. As of late it has been accounted that the utilization of antibiotic as a growth promoter in chicken has caused some undesirable outcomes. Nowadays, antibiotic safe strains of microbes have expanded the worry about the potential medical issues and food safety is more genuinely considered than earlier, Impressive consideration has been paid to therapeutic herbs as replacement for AGP. Herbs or produces including plant excerpts, essential oils, or the key components of essential oil are among the alternate promoters that are already being used in of now being utilized. There is proof proposing that herbs, spices, and various plant excerpts have appetizing, assimilation stimulating and antimicrobial properties [6]. Limitation on the utilization of antibiotic growth promoters and other therapeutic enhancer in animal diet have opened avenue for the utilization of feed added substances of natural origin such as probiotics, prebiotics, or phytogetic substances, anyway their method of activity isn't particularly in poultry are not completely comprehended and their performance benefits are not yet equivalent with feed anti-toxins . Herbs and spices are presently classified under European Union legislation as flavors and appetizing agents. Plant excerpts are standardize produces and are described in the writings by various activities. Antimicrobial, antiviral antifungal activity, incitement of appetite and emission of endogenous enzymes, advantageous impacts on gastrointestinal issue and respiratory issues, antioxidants and immunostimulating properties of plant substances are just a couple of those reported in humans and animals [7].

The performance and benefit of poultry birds to a great extent relies on improved feed change effectiveness, body weight, nonappearance of maladies and low mortality. Liver is the essential organ in the body answerable for a few significant capacities and any unsettling influence to it prompts terrible performance of the herd. Impaired liver capacities or hypoactive sluggish liver in poultry birds, directly influences indispensable capacities and results in the poor use of feed. These consequences in low efficiency, frequent disease outbreak and poor FCR [8]. Liver is engaged with a few metabolic capacities; any factor that changes its physiology may prompt liver harm, thus influencing the entire body of animals. Biochemical tests are utilized to identify a few liver abnormalities from the norm including necrosis,

hepatocyte harm, and change in liver functions. Liver enzymes show increment in the circulatory system when the cells delivering them are harmed. The two principle catalysts used to show liver capacity status are Aspartate aminotransferase (AST) and Alanine aminotransferase (ALT). Histopathology discoveries can likewise be utilized to distinguish liver variations from the norm, in this manner helping ailment determination [9].

Among the currently available poultry feed additives, natural herbal extract and plants are approved due to their described widespread beneficial effects. Based upon this, study will be designed to explore the efficacy of Herbal compounds (Liver Tonics) liquid, poly-herbal products in improving the performance of commercial broilers.

Purpose of the Study

The purpose of the experiment is to compare the impact of locally available Herbal Compounds (Liver Tonics) on the basis of growth performance and functioning of liver of the broilers.

Materials and Methods

Housing management

The examination was done under controlled environment to assess the relative impact of two locally used herbal compounds (Livol and Livotal) on feed consumption, water intake, weight attain, FCR, liver enzymes and mortality of broilers, at the Poultry Research Institute Jaba. The house was initially cleaned, white washed and properly disinfected. To make the house comfortable, rice husk was utilized as a litter. The litter was utilized at 4 inches deep for every group. Litter turning was rehearsed to limit the gas production in the poultry house. Floor space of 1 square feet per broiler was provided. The temperature of the poultry house was maintained at 95°F in 1st week, 90°F in the 2nd week, 85°F in third week and 75°F after 3rd week till the end of the experiment. House temperature was measured with digital thermometer. Biosecurity measures were taken into account to prevent the mechanical transmission of infection from out to inside of the poultry house.

Total 180 (cobb-500), day old chicks were bought from the nearby incubation centre for this examination study and kept at Poultry Research Institute Jaba to check the impact of herbal compounds (liver tonics) on feed consumption, water consumption, weight gain, FCR, liver enzymes and mortality of broilers. Weight of the chicks was taken on arrival day and randomly distributed into 3 groups. The treatments for the experiment were consisted of 3 groups, group A, group B and group C. Each group contains 60 birds and were further replicated into three subgroups (Replicates) having 20 birds in each subgroup. All the groups were given the same dietary and management conditions. The two herbal compounds (Liver tonics) Livol and Livotal were given through drinking water as per their recommended dose on the following pattern throughout the experiment period.

Study design

- **Group A:** Control (fresh water).
- **Group B:** HC (Livol) 0.5 ml/L of water.
- **Group C:** HC (Livotal) 0.25 ml/L of water.

	Group A (Control)	Group B (Treatment I)	Group C (Treatment-II)
Subgroup 1	20	20	20
Subgroup 2	20	20	20
Subgroup 3	20	20	20
Total	60	60	60

Table 1: Study design of the different groups and sub-groups for examination period.

Measurements

The feed and water were *ad-libitum* given two times in a day to the broilers and refused feed and water was collected from feeders and drinkers of all the groups and weighted to get the final consumption of feed and water per chick. From each subgroup, all the birds were randomly selected and weekly body weight was recorded using electronic weighing balance machine. Calculation of FCR was done on devoured feed by the normal bird for accomplishing one kg live body weight. Calculation of FCR was done on basis of consumed feed by broiler chicken for achieving 1 kg weight. Random selection of 6 chicks per group was selected for blood collection through wing vein on day 21, 28 and day 35. Blood samples were collected in clean plastic vacutainer (BD, Germany) clot activator tubes. Within 30 minutes after collection, centrifugation of blood samples was done at 2500rpm for the time of 15 minutes. Supernatant fluid was serum, separated through sterile pipette in sterile serum collection tubes, and was send to Veterinary Research and Diagnostic Center (VRDC) Abbottabad for the analysis of liver enzymes called Alkaline aminotransferase (ALT) and Alkaline Phosphatase (ALP) via automated biochemical analyzer. At the end of trial period, broilers from every group were weighed first and then slaughtered. Carcass weight after dressing was taken into account and calculated its percentage of dressing by using the formula below:

$$\text{Dressing (\%)} = \frac{\text{Total weight of carcass (kg)}}{\text{Live body weight (kg)}} \times 100$$

Mortality was calculated for each group and was taken into account separately for every group. Percentage of mortality was calculated according to given formula:

$$\text{Mortality (\%)} = \frac{\text{Total number of broiler died (\#)}}{\text{Total number of broiler reared (\#)}} \times 100$$

Statistical analysis

Collected data was analyzed statistically by Gomez and Gomez (2000) methods, through ANOVA. By using complete randomized design (CRD), analysis of variance was done and was computed to check the significance and insignificance among the treatment groups by using JMP software [10].

Results

Feed intake (g/bird)

Feed intake of all the three groups of the experiment was recorded on weekly basis and the results shows that feed intake was significant ($P < 0.05$) till 2nd week of the experiment. From 3rd week to the 5th week of the study, the increase in feed intake among the groups was non-significant ($P > 0.05$) as shown in table 2.

Week	Group A	Group B	Group C	P value
1 st	128 ± 3.74	127 ± 3.74	128 ± 2.94	< 0.05
2 nd	349 ± 4.32	332 ± 5.35	324 ± 5.71	< 0.05
3 rd	622 ± 7.48	608 ± 4.54	617 ± 4.32	> 0.05
4 th	821 ± 1.63	818 ± 5.71	819 ± 4.54	> 0.05
5 th	1117 ± 7.11	1095 ± 6.48	1104 ± 8.28	> 0.05

Table 2: Effect of herbal compounds on food intake (g/bird) of birds during examination period in different groups.

Water intake (ml/bird)

Water intake of all the three experimental groups was recorded weekly. Results shows that water intake of the birds was significant ($P < 0.05$) in 1st and 2nd weeks while in week 3rd, 4th and 5th, increase in water intake of the birds was non-significant ($P > 0.05$) as shown in the table 3.

Week	Group A	Group B	Group C	P value
1 st	256 ± 4.55	252 ± 5.10	259 ± 3.26	< 0.05
2 nd	697 ± 7.12	659 ± 3.55	645 ± 15.12	< 0.05
3 rd	1244 ± 14.97	1218 ± 9.42	1227 ± 7.11	> 0.05
4 th	1645 ± 8.04	1645 ± 6.97	1643 ± 5.89	> 0.05
5 th	2223 ± 7.48	2204 ± 6.68	2218 ± 5.54	> 0.05

Table 3: Effect of herbal compounds on water intake (ml/bird) of birds during examination period in various groups.

Total body weight (g/bird)

Total body weight gain of all the three experimental groups was recorded on weekly basis and presented in the table. Results indicated that the total body weight of the birds was significant ($P < 0.05$) from day 0 to 2nd week while in week 3rd, 4th and 5th the total body weight was non-significant ($P > 0.05$) as shown in table 4.

Weight gain (g/bird)

Weight gain of all the three experimental groups was recorded on weekly basis and presented in table. Recorded result shows that weight gain of the birds was significant ($P < 0.05$) in first two weeks while there is a non-significant difference ($P > 0.05$) in increase of weight gain among the birds in 3rd, 4th and 5th week, as shown in table 5.

Week	Group A	Group B	Group C	P value
0	44 ± 0.817	44 ± 0.817	44 ± 0.817	< 0.05
1 st	189 ± 5.35	201 ± 8.60	197 ± 3.70	< 0.05
2 nd	493 ± 6.16	524 ± 8.29	517 ± 8.04	< 0.05
3 rd	898 ± 8.60	942 ± 10.03	932 ± 9.90	> 0.05
4 th	1513 ± 7.87	1566 ± 3.74	1554 ± 8.04	> 0.05
5 th	2151 ± 8.64	2219 ± 6.16	2203 ± 12.32	> 0.05

Table 4: Effect of herbal compounds on total body weight (g/bird) of birds during the examination period in various groups.

Week	Group A	Group B	Group C	P value
1 st	145 ± 4.90	157 ± 8.98	153 ± 4.08	< 0.05
2 nd	304 ± 6.98	323 ± 6.53	320 ± 4.97	< 0.05
3 rd	405 ± 2.82	418 ± 5.19	415 ± 16.08	> 0.05
4 th	615 ± 11.22	624 ± 9.41	622 ± 14.99	> 0.05
5 th	638 ± 5.71	653 ± 5.65	649 ± 7.78	> 0.05

Table 5: Effect of herbal compounds on weight gain (g/bird) of birds during the examination period in various groups.

Feed conversion ratio

Feed conversion ratio (FCR) of all the three experimental groups were recorded on weekly basis and presented in the form of table. Results shows that FCR of the birds in 1st and 2nd week was significant (P < 0.05) while in 3rd, 4th and 5th week the feed conversion rate was non-significant (P > 0.05) as shown in table 6.

Week	Group A	Group B	Group C	P value
1 st	0.88 ± 0.033	0.82 ± 0.067	0.84 ± 0.023	< 0.05
2 nd	1.15 ± 0.036	1.03 ± 0.033	1.02 ± 0.038	< 0.05
3 rd	1.54 ± 0.034	1.46 ± 0.014	1.49 ± 0.056	> 0.05
4 th	1.34 ± 0.021	1.31 ± 1.313	1.31 ± 1.323	> 0.05
5 th	1.76 ± 0.024	1.68 ± 0.008	1.70 ± 0.030	> 0.05

Table 6: Effect of herbal compounds on food conversion rate of birds during the examination period in various groups.

Liver functioning test

Alanine aminotransferase (ALT) (µ/L)

Serum ALT concentration was recorded on day 21st, 28th and 35th and presented in the table. Recorded results shows that in 3rd week of the experiment, ALT concentration was significant (P < 0.05) among the groups while it was non-significant (P > 0.05) in 4th and 5th week as shown in the table 7.

Week	Group A	Group B	Group C	P value
3 rd	2.15 ± 0.01	2.07 ± 0.01	2.08 ± 0.01	< 0.05
4 th	2.19 ± 0.02	2.09 ± 2.09	2.09 ± 0.02	> 0.05
5 th	2.23 ± 0.02	2.13 ± 0.02	2.14 ± 0.02	> 0.05

Table 7: Effect of herbal compounds on serum ALT concentration (μ/L) of birds during the examination period in various groups.

Alkaline phosphatase (ALP) (μ/L)

Serum ALP concentration was recorded on day 21st, 28th and 35th day and presented in the table. Recorded results shows that in 3rd week result, the ALP concentration was significant ($P < 0.05$) while it was non-significant ($P > 0.05$) among the groups in 4th and 5th week of experiment as shown in the table 8.

Book	Group A	Group B	Group C	P value
1 st	2136 ± 8.60	2226 ± 19.02	2218 ± 8.60	< 0.05
2 nd	1817 ± 11.86	2025 ± 7.35	2021 ± 9.09	> 0.05
3 rd	1584 ± 9.27	1904 ± 6.69	1896 ± 8.54	> 0.05

Table 8: Effect of herbal compounds on serum ALP concentration (μ/L) of birds during the examination period in various groups.

Dressing percentage

Dressing percentage of the all the three group of experiment was recorded on day 35th and presented in the table. Result shows that the dressing percentage of Group B was higher than Group A and C as shown in table 9.

Group A	Group B	Group C
66 ± 0.0117	67.48 ± 0.0008	67.32 ± 0.0016

Table 9: Dressing percentage (%) of birds in different groups on day 35th of experiment.

Total mortality

Mortality of all the birds was recorded on daily basis and presented in the table. There was highest mortality recorded in the group A while similar mortality percentage was recorded in group B and group C throughout the experiment as shown in the table 10.

Week	Group A	Group B	Group C
1 st	0	0	0
2 nd	1	0	0
3 rd	1	0	0
4 th	2	1	0
5 th	0	0	1
Percentage	6.67%	1.67%	1.67%

Table 10: Total mortality of birds during the examination period in various groups.

Discussion

Our present study showed that the feed intake of the control group A after five weeks of age is higher as compare to group B (administered herbal compound Livol) and C (administered herbal compound Livotal). Our results proved that herbal compounds have no effect on feed consumption in broilers which are correlated with the study of [11] which uncovered that the supplementation of natural meds Arsilvon super, Bedgen 40 and Hepa-fix grills uncovered non-critical impact on feed utilization of ovens. The after effects of this investigation are good with the discoveries of [12] who didn't uncovered any noteworthy improvement in feed utilization because of dietary incorporation of *Moringa oleifera* leaf supper in oven diet when contrasted and those took care of diet with no supplementation. These outcomes are comparative with results of [13] who announced that by the supplementation of ginger, *Moringa oleifera* and garlic there was no huge contrast in the feed utilization of the oven among the various medications.

Mean body weight gain of treated group B (administered Livol) after 5 weeks of age was significantly ($P = 0.05$) higher than the control group A. The results of body weight gain of the present study are well in confirmation with those reported [14] that the supplementation of home grown items improve development rate in grills. [14] additionally detailed improvement in weight increase of oven chicks contrasted with control bunch by including Livifitvet convergence of liver energizers in improving gut work, supplement digestion and usage [15].

Results of our present study reveal that group B (administered herbal compound Livol) attains the maximum body weight i.e. (1566 gm) followed by group C (administered herbal compound Livotal) (1554 gm), than untreated control group A (1513 gm) after 5 weeks. These results are completely aligned with the study of [16] that is the results of his study reveals that feed intake and body weight gain in the control group was significantly lower ($P < 0.05$) as compared to two treatments Superliv DS treated group II had the maximum final body weight gain of 1614 gm followed by Xliv pro (1589) than untreated control group (1492) after 6 weeks Superliv DS and Xliv pro treatment groups had significantly ($P < 0.05$) better feed utilization in comparison to control group indicating efficacy.

Our present study shows that the Group B that is administered with herbal compounds Livol shows the best FCR. On the basis of total weight gain and feed consumption, the value of feed to gain rates were calculated. The mean FCR of treated Group B (1.68) was significantly lower than control group (1.76), mean FCR values noted from the table reveal the efficacy of supplementary herbal liver tonics in improving the feed utilization. The results of our present study are in concomitance with those reported by [17].

Information of liver compounds demonstrates that utilization of home grown and engineered items secured the liver capacity as clear by standardization of ALT and ALP chemicals level. It tends to be inferred that polyherbal plan Repchol can supplant manufactured mixes (development advertiser) as clear by the practically identical hypocholesterolaemia impact and nonattendance of greasy liver in treated gathering. The financial effect examination likewise uncovered that the winged animal took care of polyherbal definition recorded higher net returns when contrasted and control just as manufactured choline in clusein. Supplementation is both manufactured and polyherbal detailing brought about in general improvement of grill execution economy, supplement balance. Our outcomes are associated with the consequences of [18] as indicated by them Turmeric fundamentally diminished serum antacid phosphatase (ALP) of the chickens at 21 days old enough ($P < 0.05$). Diminishing impact of ALP by turmeric right now like those of Hossain., *et al.* 2012 Snowcapped Mountain is delicate marker of liver harm [19] in hepatitis; hepatocytes begin to kick the bucket because of liver harm and along these lines ALP fixation in the bile pipes increments. Fundamental oils present in turmeric [20] are known to build bile stream and bile discharge, so these

two collaborating systems may give some constructive outcomes of turmeric on hepatitis and a reaction to restrain the collection of ALP in the bile pipes [20]. Turmeric additionally essentially expanded AST of the chickens at 21 and 42 days old enough ($P < 0.05$). Moderate increment in AST and ordinary LDH might be because of an intense skeletal or heart solid injury 2 or 4 days prior or because of hepatic injury [9]. Turmeric essentially changed ALT of the chickens at 21 and 42 days old enough ($P < 0.05$) [21]. Liver as a central organ in avian digestion is vulnerable to dietary modifications. Serum ALT and AST low movement are typically deciphered as acceptable liver wellbeing and usefulness [22]. Live cell harms brought about by metabolic weight and hypertension facilitate the freedom of these cell catalysts into the serum. As the aftereffects of the present examination appeared, utilizing high vitality diets to fulfill the grill's vitality need caused liver harms, wonders which happen oftentimes with business oven rush to encourage the development rate and abbreviate the raising time frame. Right now, hepatic harm exhibited by expanded compound action saw in the flying creatures benefited from moderate vitality counts calories. Taking care of diets with high vitality raised action of circulatory AST and GGT [23], which could be credited to hepatic biliary harm brought about by fat aggregation. Conversely with our outcomes, [22] discovered raised serum AST action in the feathered creatures benefited from a high-vitality diet contrasted with those got low vitality counts calories [24].

In our results, mortality in control group A was comparatively higher as compared to the groups (B and C) that are treated with herbal compounds Livol and Livotal respectively. The mortality percentage in group A is 6.67 while in group B and C, the mortality percentage is 1.67. Mortality results are closely related with the results of [16] (B gathering) in which mortality rate was nearly lower in bunches treated with home grown mixes 4.27% and 6% in bunch B and C when contrasted with untreated benchmark group 8.8%. In this way the bearableness in the treated gathering was higher and furthermore benefit was joined. Since 3 - 4% more grills were ready to move at promoting age [16] toward the finish of investigation our outcomes were gotten by assessing cadaver and meat nature of the considerable number of gatherings with home grown mixes, at that point we inferred that among all the gatherings, Group B (regulated Livol) has higher dressing rate. These outcomes are in concomitance with the investigation of [25] that 2 gatherings that were treated with home grown mixes shows the higher dressing rate when the assessment of corpse and meat quality parameters on butchered delegate winged creatures uncovered the both treatment bunches had higher dressed and killed rate, 3 - 6 percent progressively palatable meat yield as contrast with control gathering [16].

Conclusion

On the basis of obtained results, it was concluded that the Herbal compound Livol supplementation had improves the productive performance. It was further concluded that the Herbal compound Livol had positive effects on liver functioning.

Author's Contribution

Urooj Sheikh conducted the research, collection of data and write-up to fulfill the requirement of degree of Master of Philosophy. Naqash Khalid contributed in the study designing, supervised the research work as co-supervisor, helped in each step of data collection, proper presentation and interpretation of the results and also helped in write up of the research article. Fiaz Khan supervised the study designing and helped in data collection and data analysis. Ayaz Khan provided a platform for financial support, helped and guide in study designing, data collection and laboratory analysis. Samman Sajjad helped in data collection. Sadia Tabassum helped in stactical analysis and interpretation. Yasir Amin helps in data collection. Mohsin Ali contributed in management of the research chicks. Muhammad Sohail helps in laboratory analysis and results.

Conflict of Interest

The authors declared no conflict of interest.

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