



P-ISSN: 2349-8528
 E-ISSN: 2321-4902
 IJCS 2017; 5(4): 898-901
 © 2017 JEZS
 Received: 04-05-2017
 Accepted: 05-06-2017

Manoj Kumar Bansala
 Assistant Professor, Doon (P.G.)
 College of Agriculture Science and
 Technology, Selaqui, Dehradun,
 Uttarakhand, India

Rajkumar
 Associate Professor, Department of
 Animal Genetics and Breeding,
 Sardar Vallbbhai Patel University of
 Agriculture and Technology,
 Modipuram, Meerut, Uttar Pradesh,
 India

Shalu Kumar
 Ph.D. Scholar, Department of Animal
 Husbandry and Dairy Science, Dr.
 B.S. Konkan Krishi Vidyapeeth
 (Agricultural University), Dapoli,
 Dist. Ratnagiri, Maharashtra, India

Harendra Singh Chauhan
 Ph.D. Scholar, Department of Animal
 Husbandry, Sardar Vallbbhai Patel
 University of Agriculture and
 Technology, Modipuram, Meerut,
 Uttar Pradesh, India

DS Sahu
 Assistant Professor, Department of
 Animal Nutrition, Sardar Vallbbhai
 Patel University of Agriculture and
 Technology, Modipuram, Meerut,
 Uttar Pradesh, India

SP Yadav
 Assistant Professor, Department of
 Livestock Production and
 Management, Sardar Vallbbhai
 Patel University of Agriculture and
 Technology, Modipuram, Meerut,
 Uttar Pradesh, India

Nazim Ali
 Associate Professor, Department of
 Animal Nutrition, Sardar Vallbbhai
 Patel University of Agriculture and
 Technology, Modipuram, Meerut,
 Uttar Pradesh, India

Correspondence
Shalu Kumar
 Ph.D. Scholar, Department of Animal
 Husbandry and Dairy Science, Dr. B.
 S. Konkan Krishi Vidyapeeth
 (Agricultural University) Dapoli,
 Dist. - Ratnagiri, Maharashtra, India

Effect of dietary dried rumen Digesta on carcass characteristics and serum constituents of broilers

Manoj Kumar Bansala, Rajkumar, Shalu Kumar, Harendra Singh Chauhan, DS Sahu, SP Yadav and Nazim Ali

Abstract

An experiment was conducted at Poultry Research and Training Center of Sardar Vallbbhai Patel University of Agriculture and Technology Modipuram Meerut to determine effect of dietary dried rumen digesta (DRD) on carcass characteristics and serum constituents of broilers. A total 300 day old (Cobb-400) divided into five experimental groups viz., T₁ (basal ration without DRD), T₂ (basal ration plus 5 % DRD), T₃ (basal ration plus 10% DRD), T₄ (basal ration plus 15 % DRD) and T₅ (basal ration plus 20 % DRD) with three replications and each replication had 20 chicks. The blood biochemical parameters investigated are viz., total protein, glucose, HDL, LDL and calcium and carcass characteristics namely; eviscerated weight, carcass weight, Giblet weight and dressing percentage. Results showed that 20 per cent DRD significantly improved carcass quality and dressing percentage as well as serum biochemistry of broilers. Therefore, it can be concluded that DRD used for better carcass quality and maintained normal physiological responses.

Keywords: broiler chicks, carcass, DRD and serum constituents

Introduction

A major problem facing the development of animal production is the availability and high cost of feedstuffs. Feed accounts for 55 to 70 per cent of the cost of poultry production [1]. High cost of feedstuffs has contributed to the poor performance or productivity on many poultry farms and this has led to a shortage in the availability of protein to the citizenry. There is also competition between man and poultry for conventional feedstuffs like maize. Shortage and volatility in price of feed ingredients motivated to search for alternative feed source to solve this problem [2]. demonstrate that industrial food wastes represent a valuable resource capable of replacing conventional feedstuffs, such as corn and soybean, in duck diets.

Rumen content is substantial wastes generated daily at abattoirs [3]. It is a material from the rumen of cattle which is the first stomach compartment of the ruminants. It is account for about 80 per cent of the capacity of the adult ruminant stomach [4]. It is plant material at various stage of digestion rich in protein and other micro fungi, protozoa and bacteria [5] of energy and vitamins especially vit.(B) complex utilization as animal feed will also alleviate and max the economic environmentally benign disposal house by-products [6-5]. Consequently, the objective of the present study was to determine the effect of dietary dried rumen content on carcass characteristics and serum constituents of broilers.

2. Materials and Methods

2.1 Experimental location

The present experiment was conducted at the Poultry Research and Training Centre, Sardar Vallbbhai Patel University of Agriculture and Technology, Meerut, India during 1st June to 12th July 2016. The climate of this region is sub-tropical with maximum temperature of about 45°C during summer and minimum temperature of about 20°C during winter. The frost occurs occasionally in this region during winter from December to February. The monsoon generally begins during the last week of June and ceases by the end of September. The average annual rainfall in this region is about 862.7mm and the annual relative humidity varies from 67 to 96 percent.

2.2 Experimental ingredients

Fresh Buffalo Rumen Digesta was collected from Ali Faheem Meatex Pvt. Ltd Factory, Alipur, Dhikoli, Hapur Road, Meerut-250002 (U.P.) India. The drained rumen content was sun dried and then bagged and stored prior to commencement of the research. The Sun dried bovine rumen content was milled in a hammer mill to produce finely ground dried rumen content to supplement the feed. Samples of DRC experimental diets was subjected to proximate analysis using standard methods [7]. The chemical composition of DRD is shown in Table 1.

2.3 Birds, experimental design and husbandry

A total of 300 day old chicks of broilers mixed sex and randomly assigned to 5 treatments, each treatment comprised 3 replicates with 20 birds each. Chicks were reared under similar environmental and managerial conditions during period from 1-6 weeks of age. Eight experimental diets were formulated according to nutrient specifications of the standards published by [8] with 4 levels of DRD. The 5 treatment diets namely; T₁ (basal diet without DRD), T₂ (basal diet plus 5% DRD), T₃ (basal diet plus 10% DRD), T₄ (basal diet plus 15% DRD) and T₅ (basal diet plus 20 % DRD). All birds were reared in the floor using wood shavings as litter (5-7 cm thickness). Temperature was adjusted at 39 °C in the first wk then lowered 2.5 °C each successive week, and then maintained at 28°C. Relative humidity was about 45 to 55%. The chicks were vaccinated against Newcastle disease (ND). Access to feed (pellet form) and water was provided on an *ad libitum* proximate composition of experimental diets are shown Table 1 [7]. The chick was fed starter diet from (1 to 21 days) and a finisher diet from (22 to 42 days).

2.4 Carcass quality traits

End of experiment, three birds were selected randomly from each treatment, live weight of all the birds were recorded in the evening and they were allowed to fast for 16 hours (overnight), however, drinking water was provided *ad libitum*. These birds were killed in slaughter cones by severing the carotid artery and jugular veins by Halal method. Birds were allowed to bleed for four minutes until there was no blood oozing from the carcasses. Blood was collected in beakers and samples of blood transferred to blood sample vacutainers for further analysis. Each carcass was later dipped in a water bath and feathers were removed manually with the help of pinning knife. Head and shanks were removed using a sharp knife which had been used to sever the jugular vein. Evisceration was carried out by making a circular incision around vent to cut open the abdominal cavity and removing all the internal organs. After the removal of heads and shanks, carcasses were weighed to determine their dressing percentages and manually eviscerated to determine other carcass traits, including (gizzard, liver and heart, spleen and thigh weights as percentages of live weight). The eviscerated weight included the front part with wing and hind part. Birds of all the eight treatment groups were dressed and weighed in same manner. The following traits were measured in each carcass. Dressing percentage was calculated by [9].

2.5 Blood sampling and analysis

The blood samples were collected at six weeks of age from wing vein with syringe from three birds in each replication. The blood collected in sterilized glass test tube keeping in a slant position and serum was separated. All the serum samples were stored in a deep freeze at -20 °C until it processed. All

samples of serum were analyzed in Animal Physiology Laboratory, College of veterinary and Animal Science, Meerut, India. The total protein (g/dl) and glucose (mg/dl) was estimated by the procedure given by [10], HDL cholesterol (mg/dl) by [11], LDL cholesterol (mg/dl) by [12] and Calcium (mg/dl) by [10].

2.6 Statistical analysis

The data was analysed using Op Stat-Statistical Package for Agricultural Research Workers to determine the descriptive characteristics of the parameters between the various treatment groups. Duncan Multiple Range test (DMRT) of DSAASTAT, Perugia-Italy was used to determine the significant difference of the parameters between groups.

3. Results and Discussion

3.1 Effect of DRD on carcass characteristics of broilers

3.1.1 Eviscerated carcass weight (%)

The results showed that the mean eviscerated carcass percent for the different treatment groups were found 58.33±0.54, 59.86 ± 0.35, 58.76±0.35, 60.93±0.39 and 61.96±0.35 for T₁, T₂, T₃, T₄ and T₅, respectively and observed that the mean eviscerated carcass percent among the treatment groups were significantly ($p < 0.05$) different. Similar results were quoted by [13, 14, 15, 16].

3.1.2 Carcass weight (%)

The carcass percentage higher recorded as 68.53 ± 0.304 (T₅), followed by T₄ (67.48±0.28), T₂ (65.76±1.98), T₃ (65.66±0.58) and least T₁ (61.17±0.029), respectively. The data showed that the mean carcass percent among the treatment groups were significantly ($p < 0.05$) different. Similar results were quoted by [13].

3.1.3 Giblet weight (%)

According to Table 2, showed that average giblet percent for the different treatment groups were found as 5.12±0.57, 5.53±0.35, 5.21±0.04, 5.26±0.04 and 5.35 ± 0.02 for T₁, T₂, T₃, T₄ and T₅, respectively. The statistical data revealed that the mean giblet percent among the treatment groups were significantly ($p < 0.05$) different. The similar finding recorded by [17].

3.1.4 Dressing Percentage

Dressing percentage of broilers fed dietary treatments are shown in Table 2. The dressing percentage significantly higher found in T₅ (71.91±0.35 %) followed by T₄ (70.16±0.04), T₂ (70.13±0.57), T₃ (69.20±0.05) and T₁ (69.15±0.60), respectively. The results of present experiment is agreement with [18] who recorded 77±1.02 per cent dressing per cent supplemented by 12 percent DRC.

3.2 Effect of DRC on serum constituents of broilers

3.2.1 Total protein (mg/dl)

The table 3 revealed that the mean total protein were recorded 6.15±0.02, 6.03±0.07, 6.70±0.33, 6.42±0.30 and 6.09±0.02 mg/dl at 6th week for T₁, T₂, T₃, T₄ and T₅, respectively. The total protein among the treatment groups were differed statistically significant ($p < 0.05$). The results of present study are well close with [19] and [18].

3.2.2 Glucose (mg/dl)

By table 3, highest glucose level was significantly higher recorded in T₅ (196.10±0.60 mg/dl) as compared to T₁ (194.10±0.12 mg/dl) at 6th week. The glucose among the

treatment groups were found differed significant ($p < 0.05$). The results of present study are well close with [19; 15]. However, higher value for glucose observed by [20].

3.2.3 HDL cholesterol (g/dl)

The data revealed that average HDL Cholesterol were recorded 57.77 ± 0.10 , 57.53 ± 0.25 , 58.11 ± 0.81 , 58.49 ± 0.05 and 59.23 ± 0.17 g/dl for T₁, T₂, T₃, T₄ and T₅, respectively. The HDL cholesterol in among the different treatment groups were found statistically significant ($p < 0.05$). The results of the current study were in agreement with previous study by [21] who reported that dried rumen digesta supplementation in broilers chickens in serum levels of high density lipoprotein (HDL) level. However, higher value for HDL found by [20] who recorded ranged 64.92 to 81.78 g/dl.

3.2.4 LDL cholesterol (g/dl)

The results revealed that mean LDL Cholesterol were recorded 57.53 ± 0.49 , 54.28 ± 0.11 , 51.42 ± 0.38 , 47.76 ± 0.85 , and 45.43 ± 0.62 g/dl for T₁, T₂, T₃, T₄ and T₅, respectively. The LDL cholesterol among the treatment groups were found differed statistically significant ($p < 0.05$). The results of present finding are comparable with [21].

3.2.5 Calcium content (mg/dl)

The table 3, revealed that the mean calcium volume were recorded 10.38 ± 0.36 , 10.41 ± 0.10 , 10.30 ± 0.09 , 10.28 ± 0.04 , and 11.21 ± 0.52 mg/dl at 6th week for T₁, T₂, T₃, T₄ and T₅,

respectively. The calcium among the treatment groups were found differed statistically significant ($p < 0.05$). Similar, finding are recorded by [19].

4. Conclusion

Based on the study results, 20 per cent DRD significantly improved carcass quality, dressing percentage, normal blood profile and physiological response. In addition, the new ideas like recycling some wastes as rumen contents are very helpful for environment and for production of unconventional rations. Therefore, suggested that dried rumen digesta could be utilized for better broilers production.

Table 1: Nutrient content of the Dry Rumen Digesta.

Ingredient	Nutritional value (%)
Moisture	15.45
Crude fibre	34.10
Crude protein	8.50
Ash	14.53
Ether extract	7.55
Nitrogen free extract	35.32
Metabolized energy (Kcal/kg)	1800
The compositions of the different ingredients (%)	
Ingredients	Crude Protein
Fish meal	60.30
Ground nut cake	40.50
Maize	10.20
Rice polish	8.20
Dried rumen digesta	8.50

Table 2: Effect of dried rumen digesta (DRD) on Carcass quality of broilers

Attribute	Treatment details				
	T ₁ (0.0% DRD)	T ₂ (5.0% DRD)	T ₃ (10.0% DRD)	T ₄ (15.0% DRD)	T ₅ (20.0% DRD)
Eviscerated	$58.33^d \pm 0.54$	$59.86^{bc} \pm 0.35$	$59.83^{cd} \pm 0.35$	$60.93^{ab} \pm 0.39$	$61.96^a \pm 0.35$
Carcass	$61.17^c \pm 0.29$	$65.76^b \pm 1.98$	$65.66^b \pm 0.58$	$67.48^{ab} \pm 0.28$	$67.48^a \pm 0.30$
Giblet	$5.12^b \pm 0.52$	$5.53^a \pm 0.35$	$5.21^{ab} \pm 0.04$	$5.26^{ab} \pm 0.04$	$5.35^{ab} \pm 0.02$
Dressing	$69.15^d \pm 0.60$	$70.13^{bc} \pm 0.57$	$69.20^{cd} \pm 0.05$	$70.16^b \pm 0.04$	$71.91^a \pm 0.35$

Table 3: Effect of dried rumen digesta (DRD) on serum constituents of broilers.

Attribute	Treatment details				
	T ₁ (0.0% DRD)	T ₂ (5.0% DRD)	T ₃ (10.0% DRD)	T ₄ (15.0% DRD)	T ₅ (20.0% DRD)
Total Protein (g/dl)	$6.15^{bc} \pm 0.02$	$6.03^c \pm 0.07$	$6.70^a \pm 0.33$	$6.42^{ab} \pm 0.30$	$6.09^c \pm 0.02$
Glucose (mg/dl)	$194.25^c \pm 0.12$	$195.20^b \pm 0.60$	$194.15^c \pm 0.60$	$194.86^{bc} \pm 0.35$	$196.10^a \pm 0.60$
HDL Cholesterol (mg/dl)	$57.77^d \pm 0.10$	$57.53^c \pm 0.25$	$58.11^c \pm 0.81$	$58.49^b \pm 0.05$	$59.23^a \pm 0.17$
LDL Cholesterol (mg/dl)	$57.54^a \pm 0.49$	$54.28^{ab} \pm 0.11$	$51.42^b \pm 0.38$	$47.76^c \pm 0.85$	$45.43^c \pm 0.62$
Calcium (mg/dl)	$10.38^b \pm 0.36$	$10.41^b \pm 0.10$	$10.30^b \pm 0.02$	$10.28^b \pm 0.04$	$11.21^a \pm 0.52$

5. Acknowledgements

The first authors is thankful to the Director of Research, SVBUAT, Meerut, India for the financial assistance. The authors are grateful to the Head, Department of Animal Husbandry, College of Veterinary Science and Animal Science, Meerut for providing necessary facilities to carry out this work.

6. References

- Atteh JO. Romancing the chicken: The sixty inaugural lecture of the University of Ilorin, 2003.
- Farhat LN, Chavez ER, Touchburn SP. Comparison of growth performance, carcass yield and composition, and fatty acid profiles of Pekin and Muscovy ducklings fed diets based on food wastes. *Can. J Anim. Sci.* 2001.
- Odunsi AA, Akingbade AA, Farinu GO. Effect of bovine blood-rumen digesta mixture on growth performance,

- nutrient retention and carcass characteristics of broiler chickens. *J. Anim. Vet. Adv.* 2004; 3(10):663-667.
- Church DC. Digestive physiology a nutrition of ruminant. published by D.C. Church, 1993; 1:143-189.
 - Esonu BO, Ogbonna UD, Anyanwu GA, Emelanom OO, Uchegbu MC, Etuk EB *et al.* Evaluation of performance, organ characteristics and economic analysis of broiler finisher fed dried rumen digesta. *Int. Poultr. Sci.*, 2006; 5: 1116-1118.
 - Navn. Nigeria Agro Vet News. 1994, 1-6.
 - AOAC. Official Method of Analysis. 16th ed. Association of Analytical Chemists, Washington, D.C. 1995.
 - BIS. Poultry feeds specification. Bureau of Indian Standards, New Delhi, India. 1991.
 - Mahapatra CM, Mohapatra SC. Effect of stocking density on meat yield and quality of broilers. *Indian J. Ani. Sci.* 1989; 59(7):903-904.

10. Godkar PB. Textbook of medical laboratory technology. Bhulani publishing house, Mumbai. 1994, 219-222.
11. Richmond W. HDL cholesterol Kit for determination of HDL cholesterol in serum/plasma. Clin. Chem. 1973, 19-1350.
12. Friedwald WT, Levy RL, Redrickson DS. Estimation of concentration of low density lipoprotein in plasma without use of ultrafuge. Clin. Chem. 1972; 18:449-502.
13. Jayalakshmi T, Kumararaj R, Sivakumar T, Vanan TT. Carcass characteristics of commercial broilers reared under varying stocking densities. Tamilnadu J. Vet. Anim. Sci. 2009; 5(4):132-135.
14. Gill SPS, Sharma ML. Effect of flooring system and stocking density on the performance of broilers. Indian J. Poult. Sci. 1992; 27(1):21-28.
15. Deek EL AA, Al-Harthi MA. Response of modern broiler chicks to stocking density green tea, commercial multiple enzymes and their inter actions on production performance, carcass characteristics, liver composition and plasma constituents. Int. J. Poult. Sci. 2004; 3(10):635-645.
16. Galobart J, Moran Jr ET. Influence of stocking density and feed pellet quality on heat stressed broilers from 6 to 8 weeks of age. Int. J. Poult. Sci. 2005; 4(2):55- 59.
17. Yitbarek MB. The effect of dried rumen content mixture on carcass characteristics of SASSO C44 broiler chicks. European Scientific J. 2016; 12(12).
18. Fathalla SI, Elkhair RMA, Shawky SM, Abdelrahman HA, Elfeki MA. Impact of feeding dried rumen content and olive pulp with or without enzymes on growth performance, carcass characteristics and some blood parameters of Molar ducks. Int. J. Agric. Innov. Res. 2015; 4(3):2319-1473.
19. Patel M, Sharma RJ, Kumar A, Tiwari DP, Prabakaran P, Panja A. Effect on carcass characteristics of pigs fed with different levels of jaggery filter cake along with concentrate. Indian J. Anim. Sci. 2009; 79(10):1054-1057.
20. Masoudi A, Chaji M, Bojarpour M, Mirzadeh K. Effects of different levels of date pits on performance, carcass characteristics and blood parameters of broiler chickens. J. Applied Anim. Res. 2011; 39(4):399-405.
21. Elfaki MOA, Abdelatti KA, Malik HEE. Effect of dietary dried rumen content on broiler performance, plasma constituents and carcass characteristics Global J. Anim. Scientific Res. 2015; 3(1):264-270.