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Effect of Feed Particle Size on Slaughter Parameters in Broiler Chicken

Veterinary

KEYWORDS : Broiler, Feed Particle Size, Processing Yields, Abdominal Fat and Digestive Tract Weight& Length

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ABSTRACT

One hundred and fifty,day-old commercial broiler chicks (Vencobb-400) were allotted to 3 dietary treatments with 5 replicates each and 10 birds per replicate in a completely randomized design. An iso-caloric and iso nitrogenous maize-soya based broiler feed (BIS 2007) ground in hammer mill using 3mm, 5mm and 7mm screens was offered from day 1 to 42.Homogenously mixed 6 samples of each experimental ration were taken for the measurement of particle size distributions using laboratory sieves of 4.76, 2.00, 1.00 and 0.50 mm screens. Result reveals that hammer mill screen opening of 3mm, 5mm and 7mm did not differ significantly inweight and length of different segments of digestive tract, processing yields and losses and abdominal fat per cent of broiler at 42 days of age.

INTRODUCTION

Greater emphasis has been given during the past two decades to identify the new feedstuffs to widen the feed resource base and to use growth promoters in feed so as to improve the efficiency and economic viability of broiler production. Inspite of extensive research on utilization of unconventional feedstuffs of agricultural, industrial, animal and aquatic origin there is only limited scope on actual usage of such materials in poultry rations, because of seasonal and scattered availability, variable nutrient quality, poor storage conditions and the presence of antinutritional factors or toxins. Moreover a ban on the use of antibiotic growth promoters in animal feeds has encouraged nutritionists to explore alternative feed management strategies to improve feed efficiency. In such situation improving the nutritive value of available feed ingredients is of great importance. Optimization of feed particle size is one important strategy for improving nutritive value of feed. But feed particle size reduction is the second largest energy cost after that of pelleting in the manufacture of broiler feeds (Reece, F. N., Lott, B. D. & Deaton, J. W. 1985). Because decreasing feed particles to a finer size requires greater energy use, any reduction in energy consumption used for grinding will significantly lower the cost of feed manufacture. Moreoverinfluence offeed particle size on processing yields and losses, abdominal fat percentage and digestive tract measurements of broilers is relatively unknown.Hence the present study will evaluate the effect of feed particle size on the growth performance, digestive tract development and profitability of broiler chicken.

MATERIALS AND METHODS

One hundred and fifty, day-old commercial broiler chicks (Vencobb-400) were used for the study. All the chicks were wing banded and weighed individually before housing. Chicks were allotted to three dietary treatments T_1, T_2 and T_3 with five replications per treatment and 10 birds per replicate in a completely randomized design. The three treatments were as follows:

T1- Broiler ration ground using hammer mill with 3 mm screen openings
T2- Broiler ration ground using hammer mill with 5 mm screen openings
T3- Broiler ration ground using hammer mill with 7 mm screen openings

The broiler chicks were reared under deep litter system of management. Thorough cleaning and disinfection of the experimental shed was carried out prior to the commencement of the experiment. Litter materials were spread to a thickness of 6 cm in each pen. Feeders, waterers and other equipment were cleaned, disinfected and sun dried before use.

Standard managemental practices were followed during the entire period of experiment. The chicks were brooded using incandescent bulb till they attained 3 weeks of age. Thereafter, light was provided only during night hours. The birds were provided with feed and clean drinking water ad libitum throughout the experimental period. Chicks were immunized against Ranikhet and Infectious Bursal disease. The performance of birds was recorded for a period of six weeks.

The experimental rations were formulated as per BIS (2007) specifications of nutrients for broiler chicken. All ration were iso-caloric and iso-nitrogenous. Broiler starter ration was fed from 0 to 3 weeks of age and thereafter broiler finisher ration from 4 to 6 weeks of age. The particle size distribution of the starter and finisher rations is presented in Table 1.

The particle size reduction of experimental ration was achieved by using a hammer mill (Precision Products, Ahmadabad, Gujarat, India) with screens of 3mm, 5mm and 7mm openings.

Six samples of each experimental ration after the homogenous mixing were taken for the measurement of particle size distributions. The particle size were determined by passing 100 g of each sample through a series of laboratory sieves (4.76, 2.00, 1.00 and 0.50 mm screens) and quantifying the amount of samples collected on each screen and a pan under the 0.5 mm screen. Parameters such as Processing Yields and Losses, Abdominal Fat Percent and Digestive Tract Measurements were evaluated.

Data collected on various parameters were analyzed statistically as per methods described by Snedecor and Cochran (1994) and significant differences were spotted by applying Duncan's Multiple Range Test (Duncan, 1955). All the tests of difference between means were conducted at five percent probability level.

RESULTS AND DISCUSSION

Results of the slaughter study parameters in broiler chicken are presented in table 2.

The results of this study indicate that feed particle size have no influence on processing yields and losses in broiler chicken at 42 days of age. This result was in close agreement with the find-

ings of Sihaget al. (2008), Svihuset al. (2004) and Bendettiet al. (2011) who reported no significant difference in the weight of organs weights, dressing percent and carcass yields in broiler chicken at 42 days of age on feed ground through hammer mill of screen openings 2 to 10mm.

Feed particle size have no influence on abdominal fat per cent in broiler chicken at 42 days of age.This result was in close agreement with the findings of Yasar (2003) and Bendettiet al. (2011) who observed that no significant difference in abdominal fat per cent in broiler chicken when fed with wheat grain ground using hammer mill attached with 4 and 10mm sieves from 0 to 42 days of age.

The results of this study indicate that feed particle size have no influence on relative digestive tract measurements in broiler chicken at 42 days of age. It could be due to selective feeding of smaller corn particles by birds especially during initial period in all dietary treatment. This result was in close agreement with the findings of Yasar (2003) who reported that the relative gut weight values depicted no statistical difference in broilers when fed with wheat grain ground using hammer mill attached with 4, 5, 6 and 7 mm sieves, from 0 to 42 days of age. Santos *et al.* (2008) conducted a study on influence of particle size on broilers fed corn-soybean meal diets and reported that the experimental diets had no significant effect on the total size of the small intestine. Bendetti *et al.* (2011) and Svihus*et al.* (2004) reported that variation in particle size had no significant infuence in gizzard weight, length of small intestine+ large intestine in broiler chicken when fed with feed ground using hammer mill sieves of 3 to 10mm for a period of 42 days.

Overall it can be concluded that hammer mill screen opening of 3mm, 5mm and 7mm did not differ significantly inweight and length of different segments of digestive tract, processing yields and losses and abdominal fat per cent of broiler at 42 days of age.

Table 1.Per cent particle size distribution of broiler experimental rations.

Laboratory Sieve Size (mm)	Broiler Starter Ration			Broiler Finisher Ration		
	T_1 (HMSO-3mm)	T_2 (HMSO- 5mm)	T_3 (HMSO-7mm)	T_1 (HMSO-3mm)	T_2 (HMSO-5mm)	T_3 (HMSO-7mm)
>4.75	0.00	0.28	2.94	0.00	2.33	5.11
2.00 - 4.75	11.51	13.65	23.10	13.33	20.56	25.22
1.00 - 2.00	42.50	43.51	41.60	46.67	45.56	41.22
0.50 - 1.00	32.17	28.02	22.37	32.78	25.67	23.22
<0.50	13.82	14.54	9.99	6.44	5.89	5.22

HMSO- Hammer Mill Screening Opening

Table 2.The mean slaughter study parameters of broiler chicken at 42 days of age as influenced by feed particle size

Parameter	T_1 (HMSO-3mm)	T_2 (HMSO-5mm)	T_3 (HMSO-7mm)
Processing Yields And Losses			
Eviscerated yield	69.25±1.46	71.38±0.90	72.18±0.64
Giblet yield	4.58±0.18	4.30±0.20	4.49±0.12
Ready-to-cook yield	74.71±1.54	77.37±1.02	77.98±0.89
Total losses	25.29±1.54	22.63±1.02	22.02±0.89
Per Cent Abdominal Fat Weight			
	0.88±0.14	0.88±0.14	0.88±0.14
Mean Relative Digestive Tract Weights (g/kg Body Weight)			
Proventriculus	0.43±0.01	0.39±0.01	0.37±0.02
Gizzard	2.07±0.13	1.92±0.10	1.98±0.03
Duodenum	0.71±0.05	0.67±0.07	0.65±0.05
Jejunum	1.03±0.05	1.17±0.04	1.11±0.04
Ileum	0.80±0.04	0.85±0.07	0.96±0.06
Small intestine	2.56±0.09	2.69±0.16	2.72±0.14
Cecum	0.39±0.04	0.38±0.03	0.42±0.02
Mean Relative Digestive Tract Length (cm/kg Body Weight)			
Proventriculus	0.19±0.01	0.18±0.01	0.16±0.01
Gizzard	0.28±0.01	0.27±0.02	0.25±0.02
Duodenum	1.45±0.08	1.48±0.11	1.33±0.08
Jejunum	3.44±0.12	3.70±0.14	3.45±0.12
Ileum	3.43±0.08	3.55±0.16	3.30±0.11
Small intestine	8.32±0.24	8.73±0.40	8.08±0.28
Cecum	1.42±0.11	1.48±0.11	1.53±0.08

HMSO- Hammer Mill Screening Opening

REFERENCE

Benedetti, M.P., Sartori, J.R., Carvalho, F.B., Pereira, L.A., Fascina, V.B., Stradiotti, A.C., Pezzato, A.C., Costa, C. & Ferreira, J.G. 2011. Corn Texture and Particle Size in Broiler Diets.Br. J. Poult. Sci., 13(4): 227-234. | Bureau of Indian Standards (BIS). 2007. Indian standard poultry feeds specifications. 5th revision. IS: 1374-2007, ManakBhavan, 9, Bahadur Shah Zafer Marg, New Delhi. 7p. | Duncan, D.B., 1955. Multiple Range Test and Multiple F-tests. Biometrics, 11, 1 - 42. | I.S.I. 1973.Indian Standards Institution.Code for handling, processing, quality evaluation and storage. IS 7049, ManakBhavan, 9, BahadurshahZapar Marg, New Delhi. | Reece, F. N., Lott, B. D. & Deaton, J. W. 1985.The effects of feed form, grinding method, energy level, and gender on broiler performance in a moderate (21 °C) environment.Poult. Sci., 64:1834–1839. | Santos, F. B. O., Sheldon, B. W., Santos, Jr. A. A., &Ferket, P. R. 2008. Influence of housing system, grain type, and particle size on salmonella colonization and shedding of broilers fed triticale or corn-soybean meal diets. Poult. Sci., 87:405-420. | SihagZile, S. &Berwal, R.S. 2008.Effect of feed particle size on the performance of broiler chickens. Indian J. of Poult. Sci., 43: 71- 74 | Snedecor, G.W. & Cochran, W.G. 1994.Statistical Methods.8thedn.The IOWA State University Press, Ames, IA. | Svihus, B., Klovstad, K. H., Perez, V., Zimonja, O., Sahlstrom, S. &Schuller. R. B. 2004. Physical and nutritional effects of pelleting of broiler chicken diets made from wheat ground to different coarsenesses by the use of roller mill and hammer mill. Anim. Feed Sci. Technol., 117:281– 293. | Yaşar, S. 2003. Performance, gut size and ilealdigesta viscosity of broiler chickens fed with a whole wheat added diet and the diets with different wheat particle sizes. Int. J. Poult., Sci.2:75–82