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Comparative Study of Self and Commercially Formulated Feed on Gut Development of Broiler Chickens

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Abstract

This study is aimed at comparing the effect of commercial and self-formulated feed on gut development using Cobb 500 zarterch broilers. 500 day old broiler chicks were ordered from a commercial hatchery, management were intensively based on animal welfare standard. Chicks were assign to five treatment in a complete randomized design in order to evaluate to effects of the feed on gut development. Guts measurement data were record in excel and SPSS version 23 software was used to analyze the data. The carcass and internal organs weight at the end of the 56 day. No significant differences was seen on all the parameters measure throughout the research trial. The carcass and internal organs did not differ significantly among the treatment group. Based on the result from the current study, it is concluded that diet A produce the best results. However, processing methods used in other treatment might has affects the nutrient composition and feed intake in that treatments. Further research is needed on the different processing temperature and time.

Key word: Broiler, gut development, commercial, self-formulated, feed.

Introduction

The increased in cost of commercially formulated feeds has a serious impact to poultry production and profit for intensive commercial broiler farming worldwide. This led to an increase in price of broiler chicken in Nigeria. Poultry refers to chickens, turkey, ducks, geese, guinea fowl used for food Banerjes, G.C (1992). Poultry (chickens) among all the domesticated birds have no

religion or cultural barrier hindering the production and consumption worldwide (Burton, E., 2017) and (Feetham 1990).

In Nigeria, Poultry production is seen to be one of the most profitable business known. However, there are so many challenges as there is competition between poultry and human in term of raw material used as feed such as maize, sorghum, and other grain crops. As a consequence, feed ingredients need to be acquired from distant supply area and may not be hundred percent (100%) sufficient in nutrients content and also very expensive (Nyoupayou 1990). Researches have been undertaken since the 1930s on ways to improve feeds efficiency in broiler birds' production. Comparative trials have been conducted on the use of commercially formulated feeds and the locally produced feeds to find out the most efficient form of feed that yields high growth rate and reduce production costs. (Mc Donald, 1987). This research is designed to compare the effect of self-formulated and commercially prepared broiler feed on the gut development of a broiler chicken.

Materials and Methods

Subjects and Husbandry of Birds

In order to evaluate the performance of the feeds used, five hundreds (500) day old broilers were ordered from a commercial hatchery (Zartech) in plateau state. A total number of 500 chicks was needed for the trial but additional chicks were included so as to replace the number of birds that died during transportation. Prior to the distribution of birds in the pen, birds with signs of ill-health and unusual size were removed from the population when inspected and weighted using a top pan balance. Birds within the range of 39g and 42g was used for the trial for a uniform growth. Prior to the bird's arrival, the study room were cleaned, disinfected and pre-heated at 31®C using heater. The trial room were partitioned 5cm depth wood shaving was used as bedding material to regulate welfare issues such as footpad dermatitis. Pens were labelled as A, B, C, D and E. The 5 treatments were fed with self-formulated and commercial feed inclusion of appropriate treatments in the starter and finishers diets. *Ad libitum* feed and water were provided to birds using feeding troughs and nipple drinker respectively. Birds are managed using controlled temperature and ventilation which are regulated according to behavioural changes and the age of the birds as recommended by animal welfare act 2006. Lighting of the study room was provided according to the age of the birds as recommended by animal welfare regulations. Records of daily temperature and humidity in the trial room will maintained, health check and behavioural monitoring was maintained twice daily so as to assess the welfare of the birds. On the trial day, birds were euthanized (using cervical dislocation) humanly, the length and weight of intestinal organs were measured, carcass, dressing percentage were also be determined on the trial day.

Data were analysed using ANOVA in IBM SPSS (version 23), confidence and significant level were set at 95% and ($p < 0.05$) respectively.

Table 1: composition of broiler starter diets containing differently processed soya bean

Treatment (%)

Ingredient	A	B	C	D	E
Maize		60	26.	26.	26.
Maize bran	-	0	30	30	30
Local fish meal	-	0	7	7	7
Soyabean meal (full fat)	-	34.43	0	0	0
Toasted soya bean	-	0	10	0	0
Full fat soyabean	-	0	0	10	0
Boiled soya bean	-	0	0	0	10
L-lysine HCL	-	0.25	1.5	1.5	1.5
Premix	-	0.52	10	0	0
DL-methionine	-	0.35	1.0	1.0	1.0
Bone meal	-	2.18	4.1	4.1	4.1
Salt	-	0.43	0.3	0.3	0.3
Total		**100**	**100**	**100**	**100**
Calculated Analysis-	**-**				
ME (Kcal/kg)	-	3084.20	3152.6	3152.7	3035.8
CP	-	24.36	25.3	24.4	24.3
CF	-	3.50	3.9	5.1	4.6
Fat	-	3.42	9.1	8.6	8.3
Lysine	-	1.4	2.1	2.1	2.1
Meth	-	0.69	1.2	1.2	1.2

Table 2: composition of broiler finisher diets containing differently processed soya bean

Treatment (%)

Ingredient	T1	T2	T3	T4	T5
Maize	-	65.46	22.0	22.0	22.0
Maize bran	-	0	36.1	36.1	36.1
Local fish meal	-	0	1.3	1.3	1.3
Soyabean meal (full fat)	-	27.29	25	25	25
Toasted defatted BSFL	-	0	10	0	0

Full fat soya bean	-	0	0	10	0
Boiled soya bean	-	0	0	0	10
DL-methionine		0.35	0.03	0.03	0.03
Bone meal	-	0	5.1	5.1	5.1
Salt	-	0.40	0.3	0.3	0.3
Total	**-**	**100**	**100**	**100**	**100**
Calculated Analysis-					
ME (Kcal/kg)	-	3226.90	3024.1	3024.232	3005.60
CP	-	17.73	21.1	20.1 20.0	
CF	-	3.30	4.6	5.8	5.3
Fat	-	3.41	8.6	8.2	7.8
Lysine	-	1.11	0.7	0.7	0.7
Meth	-	0.55	0.2	0.2	0.2

Results and Discussion

The effects of experimental diets on carcass characteristics, live weight and gut morphometric were presented in Table 5 and 6. The result of the study indicated the feeding both self- formulated and commercial feed did not significantly ($p>0.05$) influence the live weight of the birds as well as the organ characteristics such as lungs, liver, kidney and the heart. Similarly, no significant difference ($p>0.05$) was found in abdominal fat, spleen and gizzard throughout the experiment

As shown in table 6, there is a numerical increase in the pancreas weight of 0.42% and 0.37% on chickens fed treatment B and C respectively. While a decrease in pancreases weight of 0.20, 0.30 and 0.31 in birds fed diet A, D and E respectively.

In evaluating the effects of different feed on intestinal length. No significant relationship ($p>0.05$) was seen in the present research. However, as shown in table 6, there is a significant increase of intestinal length 79.47cm and 87.57cm and ileum length, 2.02cm and 2.08cm in treatment A and E. on a contrary, there is a numerical decrease in the value of spleen and Gizzard in bird fed diet A compared to other treatments. However, the diet has no influence on the organs.

Table 3; Effects of different experimental diets on carcass characteristics.

Carcass characteristics	Experimental diets				
	A	B	C	D	E
Live wt (g)	2699.0	1900.40	2300.70	2600.10	2520.50
Plug wt (g)	2301.2 2	1640.45	2010.30	2430.20	2230.10
Eviscerated wt (g)	2101.50	1420.01	1700.55	2150.11	2005.00
Head (%)	2.75	2.02	2.10	2.57	2.40
Neck (%)	1.41	1.34	1.48	2.01	1.36
P value	NS	NS	NS	NS	NS

Table 4; Effects of different experimental diets on gut development of a broiler chickens

	A		B	C	D	E
Intestine (%)	3.10		2.30	2.69	2.80	2.75
Liver (%)	2.20		1.84	1.90	2.05	1.99
Pancreas (%)	0.20		0.42	0.37	0.30	0.31
Spleen (%)	0.09		0.13	0.17	0.12	0.10
Gizzard (%)	2.07		2.36	2.23	2.17	2.20
Duodenum length (cm)		16.67	6.07	4.50	5.26	14.20
Duodenum width (cm)		1.42	1.19	2.58	2.92	2.97
Ileum length (cm)		2.02	0.94	1.62	1.82	2.08
Small intestine (cm)		79.47	69.35	70.00	87.57	71.00

Discussion

Numerically, treatment A has higher value for live, plug and evisirected weight during the research trial. This could be attributed to the high feed intake observed by birds on treatment A and E (Doma et al 2001).

From the result obtained in this study, the higher value of gizzard observed in diet B and C could be attributed to the high fibre content in the diet (Gonzalez-alvarado et al 2007). The result of this study agrees with the work of Meteos et al (2012), who reported that feeding high fibre diet decreases the length and weight of ceca and digestive organs resulting in decrease in live weight and dressing percentage as shown in diet fed treatment B and C.

It is reported that there are little literatures on time-course of response of pancreas and trypsin inhibitors (Madar, 1979). Scientific studies shows that pancreas enlargement in broiler chicken is induced by trypsin inhibitors, this is as the result of a negative feedback of the mechanism regulating the secretion of enzymes in response to trypsin concentration (schneeman and Lyman 1975). The decreased protease activity in the intestine is as a result of the trypsin inhibitors found in the soybeans. It is accepted generally that low growth performance of chickens and pancreatic hypertrophy is as a result of the presence of trypsin inhibitors found in under-processed soybean. (Slaff *et al.* 1984). In evaluating the effects of different methods of processing soybean on intestinal weight and length (jejunum and ileum) no significant relationship ($p>0.05$) was seen in the present research.

A significance increase observed in the intestinal length 79.47cm and 87.57cm and ileum length, 2.02cm and 2.08cm in treatment A and E suggests an increased surface area for greater absorption of nutrients in birds fed diet A and E (Almarall et al 1995). On the other hand, the lower figures in gut measurement observed in extrusion method

shows reduced absorption of available nutrient this contrary to the report of Iji *et al.*, (2001). Yason (1987) reported that shortening of small intestine particularly villi and crypts lead to poor nutrient absorption.

Conclusion and Recommendation

No significant differences was seen on all the parameters measure throughout the research trial. The carcass and internal organs did not differ significantly among the treatment group. Based on the result from the current study, diet A perform the best results in terms of gut development. However, processing methods used in other treatment might have affected the nutrient composition and feed intake on that treatments. Further research is needed on the different processing temperature and time in order to effectively conclude.

References

Aini I. (1990). Indigenous chicken production in south East Asia. *World poultry science journal. 46-125-132.*

Banerjee G.C (1987). Animal husbandry; 8th edition; Oxford and IBN publish, Oxford.

Francisco p, paolo. T., and Eugeni Roura. 2017. Modulation of feed intake in pig and chicken. Feed ingredients, additives and technologies for a healthy gut in pigs. *Journal of Animal feed.*

Gonzalez-alvarado, J.M., Jimenez-Moreno E, LazaroR and Mateos G.G (2007). Effects of types of cereal, heat processing of the cereal, and inclusion of fibre in the diet on productive performance and digestive traits of broilers. *Poultry science,* 86 (8); 1705-1715

Hossain. M. A (2006). Performance of broiler fed with different commercial compound. *Journal of Veterinary medicine.*

Mateos G.G., Jimenez-Moreno E, Serrano M.P and Lazaro RP (2012). Poultry response to high levels of dietary fibre source varying in physical and chemical characteristics. *Journal of Applied Poultry Research*, 21 (2); 156-174

McDonald D. (1987). Animal production 3rd Edition; Longman Newyork. USA.

Nyoupayou. (1990). Comparative economic analysis of mash and pelleted feed in broiler chicken.

Smith A.J (1990). Poultry-tropical Agriculturist series, pp 179-184 CTA Macmillan London

Igbokwe (2010). Effects of feeding garlic on the performance and immunity of broiler chickens. *Asian Journal of poultry science. 4:182-189*

Waldroup P.W (1982) Whole soybean for poultry feed. *World poultry science Journal, 38, 28-35*