International Journal of Science and Research Archive
eISSN: 2582-8185
Cross Ref DOI: 10.30574/ijsra
Journal homepage: https://ijsra.net/

(RESEARCH ARTICLE)

Check for updates

Growth performance, serum biochemicals and lipid profile of finisher broilers fed Gradeed levels of kitchen charcoal as toxin binder

Ajayi M. A [1,*], Ayodele E. A. [2] and Njoku U. J. [3]

[1] *Department of Agricultural Technology, Akanu Ibiam Federal Polytechnic, Unwana, Ebonyi State, Nigeria.*
[2] *Department of Food Technology, Akanu Ibiam Federal Polytechnic Unwana, Ebonyi State,Nigeria.*
[3] *Department of Animal Health and Production Technology, Akanu Ibiam Federal Polytechnic, Unwana, Ebonyi state, Nigeria.*

International Journal of Science and Research Archive, 2024, 13(01), 025–028

Publication history: Received on 17 July 2024; revised on 30 August 2024; accepted on 02 September 2024

Article DOI: https://doi.org/10.30574/ijsra.2024.13.1.1595

Abstract

This study was conducted at the poultry unit of Agricultural Technology Departmental research and demonstration farm, Akanu Ibiam Federal Polytechnic, Unwana, Ebonyi State, Nigeria, to evaluate the serum biochemical and lipid profile of finisher broiler fed different levels of Kitchen charcoal. 60 pieces of unsexed three week old broiler were used for this experiment; the birds were grouped into four treatments and replicated thrice at 5 birds per replicate. The birds were placed on four experimental diets with the inclusion of kitchen charcoal at 0%, 1.5%, 3% and 4.5%. the experiment lasted for 21 days and the resultant effect of the experiment showed No significant difference (P> 0.05) was observed among all the parameters considered for both the serum biochemical and lipid profile of broiler finisher fed dietary levels of Kitchen charcoal. This is an indication that dietary kitchen charcoal had no effects on the serum and lipid profile of the experimental birds.

Keywords: Growth; Performance; Hematological indices; Lipid and profile

1. Introduction

The increasing demand for animal protein has aroused great interest in the production of fast growing animals with short generation intervals. Obinne and Okorie (2008) reported that expansion of poultry industry in Nigeria holds the greatest promise for bridging the animal protein requirement gap prevailing in the country within the shortest possible time. (Adeyemi, 2005) reported that protein from poultry meat and egg is of good quality and is used as a standard against which other proteins are compared. Broiler chickens are fast growing specie of poultry that are commonly raised to provide tender meat for human consumption. The availability of cheap and good quality protein sources remains the single most important limiting factor in poultry production in Nigeria (Adeyemi, 2005).However, the rising cost of poultry feed has continued to be a serious problem. This is because feed alone accounts for about 70% of the total cost of production (Ogundipe et al., 2003). Competition for conventional feedstuffs by man, industry and livestock has contributed immensely to the high cost of these feedstuffs in the local markets. This high cost coupled with inadequate knowledge of possible alternative and cheap ingredients have been the most important factors militating against the increase in commercial poultry production in Nigeria and other developing countries (Olorede and Ajayi, 2005).

Charcoal obtained through dry distillation of hardwood contains approximately 96% of pure carbon and 4% of other mineral compounds in organic form (Majewska and Zaborowski, 2003). Insoluble mineral compounds contained in charcoal undergo dissociation in the presence of gastric hydrochloric acid. They are converted into colloidal, soluble and active form (Scott et al., 2016). Ions of elements act as biocatalysts. Therefore, they contribute to regulating

* Corresponding author: Ajayi M. A

metabolic processes, maintaining the proper osmotic potential of body fluids, activating enzymes, hormones and antibodies. Charcoal has enormous adsorptive properties. It acts curatively on the gastrointestinal tract, absorbing gases such as hydrogen sulfide and ammonia that are formed there, bacterial toxins as well as mycotoxins produced by fungi (Edrington et al., 2017; Shareef et al., 2018). According to Garwacki and Wiechetek (2018), charcoal is also beneficial in cases of poisoning by such compounds as alkaloids, phenol, glycosides and even strychnine and potassium cyanide. Charcoal is not digested in the gastrointestinal tract, and it binds various substances through physical interactions regardless of whether they are ionized or not. By binding of ammonia, charcoal protects the intestines against alkalization. It prevents intestinal infections and stops diarrhea by adsorbing and eliminating the germs in feces, but it not bactericidal. The minerals contained in charcoal form bases with water, lower the surface tension of the digests and emulsify fat, thereby supporting liver functions and enabling the digestion and assimilation of fat. The beneficial effect of charcoal on humans and animals has been known for a long time. Its favorable influence on increasing the body weight of broiler chickens, their survival and feed utilization has been described by Edrington et al. (2017),

2. Experimental Diet

The dietary treatments were based on a commercially produced diets. Kitchen charcoal gathered from Unwana community, ground and sieved with 1 mm sieve. It was thoroughly mixed with the feed, at varying inclusion levels: 0% (T1-0%), 2% (T2-4%), 3% (T3-6%) and (T4-8%) of the commercial broiler feed, on DM basis. They were fed the experimental diets *ad-libitum* during the period of the experiment.

2.1. Experimental Birds and Management

60 unsexed day-old commercial broilers were used in carrying out the research. The birds were distributed randomly into four groups of 15 birds each, replicated thrice with 5 birds per replicate. Routine and occasional health management practices were strictly observed. All necessary vaccination and medications were administered accordingly.

2.2. Data Collection

Data on growth performance of the experimental birds were obtained from daily feed intake records. They were used to calculate the feed conversion ratio (ratio of feed intake to weight gain) at the 28th day of the experiment, 5 mls of blood sample was collected with a sterile needle from the wing veins of randomly selected birds,3 per treatment, The blood was collected into properly labeled sterile tubes. The samples were transferred to shalom Laboratory Nsuuka, Enugu State Nigeria for determination of serum biochemicals and lipid profile of the birds. Parameters such as Platet, Neutrophil,Lymphocytes,Eosinophil and Monocytes were considered for the serum biochemicals while triacyglcerol (TAG), total cholesterol (TC), high density lipoprotein-cholesterol (HDL-C) and low density lipoprotein-cholesterol (LDL-C concentrations) were considered for the lipid profile.Data collected were subjected to Analysis of Variance (ANOVA) using SPSS statistical package (SPSS 16.0 for widows Inc. Chicago IL, USA). Duncan's Multiple Range Test was used to separate significant mean differences. Significant differences were considered at 95 % level.

3. Performance Of Broiler Finisher Fed Graded Levels Of Kitchen Charcoal

Tables 1,2 and 3 present the performance serum properties and lipid profile of broiler finisher fed graded levels of kitchen charcoals as toxin binder.

Table 1 Performance of Finisher Broilers Fed Graded Levels of Kitchen Charcoals as Toxin Binder

Parameter	T 1	T 2	T 3	T 4	SEM
Initial body weight(g)	0.810	0.820	0.800	0.820	0.0030
Final body weight(kg)	2.230^{ab}	2.360^{b}	2.240^{ab}	2.030^{a}	0.4850
Average daily weight gain(kg)	0.250^{ab}	0.270^{b}	0.253^{ab}	0.247^{a}	0.0038
Daily feed intake(kg)	0.160	0.173	0.157	0.170	0.0034
FCR(kg)	0.640^{ab}	0.640^{ab}	0.617^{a}	0.690^{b}	0.0106
Mortality	0.000	0.000	0.000	0.000	0.0000

a,b,Different superscripts in rows mean statistically significant difference (P< 0.05) while values without superscripts means no significant difference (P> 0.05). SEM = standard error of mean, T 1 =control feed. T 2= 1.5% inclusion levels of Kitchen charcoal. T3=3 % inclusion levels of

Kitchen charcoal. T 4=4.5% inclusion levels of Kitchen charcoal, T 1 =control feed. T 2= 1.5% inclusion levels of charcoal. T3=3 % inclusion levels of charcoal. T 4=4.5% inclusion levels of charcoal

Table 2 Serum properties of Finisher Broilers Fed different Levels of Kitchen charcoal

Parameter	T 1	T 2	T 3	T 4	SEM
Platet	203.33	210.00	210.00	210.00	4.58
Neutrophil	65.33	62.67	60.67	67.33	1.41
Lymphocytes	32.67	35.33	38.67	32.00	1.24
Eosinophil	2.00	1.33	0.67	0.57	0.86
Monocytes	0.00	0.00	0.00	0.00	0.00

SEM = standard error of mean, T 1 =0% inclusion means no significant difference (P> 0.05). SEM = standard error of mean, T 1 = 0% inclusion levels of Kitchen charcoal. T 2= 1.5% inclusion levels of Kitchen charcoal. T3=2% inclusion levels of Kitchen charcoal. T 4= 4.5% inclusion levels of Kitchen charcoal

Table 3 Lipid profile of Finisher Broilers Fed different Levels of Kitchen Charcoal

PARAMETER	T1	T2	T3	T4	SEM
Basophil	0.00	0.00	0.00	0.00	0.00
Triglycerides	1.77	1.93	2.10	1.90	0.50
Cholesterol	4.87	4.90	5.67	5.57	0.18
High density lipoprotein	1.57	1.90	2.03	1.77	0.94
Low density lipoprotein	2.95	2.61	3.21	3.31	0.18

SEM = standard error of mean, T 1 =0% inclusion levels of Kitchen charcoal. T 2= 1.5% inclusion levels of Kitchen charcoal. T3=3 % inclusion levels of Kitchen charcoal. T 4=4.5% inclusion levels of Kitchen charcoal, a,b,Different superscripts in rows mean statistically significant difference (P< 0.05)

4. Discussion

The results of the growth performance, serum biochemical and lipid profile of broiler finisher fed dietary levels of Kitchen charcoal as revealed in tables1, 2 and 3 respectively showed that no significant differences were observed in all the parameters considered in this study. This could be an indication that Kitchen charcoal used for this study did not contain any poisonous chemicals that can affect the experimental birds health wise, This is in line with the report of Katharina et al; 2019,who argued in their work that kitchen charcoal does not in any way improve animal health. However, this claim was contrary to the report of Ajayi et al, 2024 who asserted that 4.5% inclusion level of charcoal increased the red blood cell in finisher broiler because of high level of carbon at the dietary inclusion which could lead to lung problem. It is noteworthy that wet feaces was not sighted in the pens of the treatments containing dietary levels of charcoal during the experiment. This is suggesting that dietary charcoal is capable of controlling diarrhea in broiler production.

5. Conclusion and recommendation

The finding of this study is evidence that inclusion of Kitchen charcoal in the diet of broiler birds did not in any way have negative effects on the birds. However, it is recommended that further research should be conducted to investigate the efficacy of kitchen charcoal on odour and diarrhea controls in broiler production as it was observed during the experiment.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1] Adeyemi O. A. (2005). Nutritional evaluation of broilers diets formulated with enriched unpeeled cassava root meal fermented with rumen filtrate. Ph. D. Thesis. University of Agriculture Abeokuta, Nigeria. 185 Pp. diets of broiler chickens. *Bulletin of Animal Health and Production in Africa,* 53*:* 61- 67.

[2] Ajayi, M. A., Eziuloh, N. E and Isuama Isu.(2024). Proximate analysis and Hematological indices of broiler finisher fed dietary levels of kitchen charcoal as toxin binder. Book of abstract ASUPNEK 2024.1st International hybrid conference held on 18-21st June,2024 at comrade Anderson Ezeibe solidarity complex,ASUP secretariat, Federal Polytechnic,Nekede, Imo State,Nigeria. page(39)

[3] Edrington T.S., Kubena L.F., Harley R.B., Rottinghaus G.E.(2017). Influence of a superactivated charcoal on the toxic effects of aflatoxin or T-2 toxin in growing broilers. Poult. Sci. P. 1205–1211.

[4] Katharina, H., Jenny S., Jule, K. S., Nicole, K. and Birgit, P.(2019).Effects of enriched charcoal as permanent 0.2% feed additive in standard and low protein diets of male fattening turkys: An on-farm study. Journal of Animal Basel. August; 9(8) :PP 541. Dio:10.3390/ani9080541.

[5] Majewska T., Zaborowski M (2003). Charcoal in nutrition of broiler chickens. Med. Weter..Vol. 1. P. 81–84

[6] Obinne, J.I. and Okorie, A.U. (2008). Effect of different crude protein and digestible energy levels on the growth performance of rabbits in the tropics. *Nigerian Journal of Animal Production.* 35: 210 216.

[7] Ogundipe, S.O., Abeke, F.O., Sekoni, A.A., Dafwang, I.I. and Adeyinka, I.A. (2003). Effects of cooking duration on the utilization of (*lablab purpureus*) beans by pullet chicks*. Proceedings of the 28th Annual Conference of the Nigerian Society for Animal Production, vol. 28,* Pp. 233-235*.*

[8] Olorede, B.R. and Ajayi, A.F. (2008). Replacement of groundnut cake and maize with *Falderbiaalbida*G.O.A. in the P. 371–378.

[9] Scott, M., Neishiem, M. C. and Young, R. J. (2016).Nutrition of chicken 3rd Edition.pp 121-304