Journal of Animal and Veterinary Advances 5 (3) : 191-193, 2006

Effects of Bitter Kola (*Garcinia kola*) as Growth Promoter in Broiler Chicks from Day Old to Four Weeks Old

O.S. Adedeji, G.O. Farinu, S.A. Ameen and T.B. Olayeni
Department of Animal Production and Health,
P.M.B. 4000, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria

Abstract: The effect of different inclusion levels of bitter kola (*Garcinia kola*) dry seeds powder on feed intake, body weight gain/week, feed efficiency/ week and carcass characteristics of broiler chicks from day old to 4 weeks were studied. 200 broiler chicks of Anak strain were assigned to 5 groups in which each group contained 40 birds 0% (w/w), 2.5% (w/w), 5% (w/w), 7.5% (w/w) and 10% (w/w) dry seed powder of *G. kola* levels were included in the groups, respectively. Feed intake, body weight gain and feed efficiency were significantly ($p<0.05$) different. Feed efficiency is highest in 0, 2.5% and lowest in 5 and 7.5% inclusion levels. Absence of mortality was recorded which may be due to the autimicrobial effects of *G. kola* dry pounder seed inclusion in the diets.

Key words: Bitter kola,growth promoter 4 weeks old broiler chicks

INTRODUCTION

The bitter kola (*Garcinia kola*) belongs to the family of plants called Gutifecae, the genus is known as Garcinia. It is a perennial crop growing in the wild forest, distributed throughout West and Central Africa and can attain a height of 35-40 metres[1].

Medicinal uses include, as a purgative and anti-prasite. The seeds are used in the treatment of bronchitis and throat infections. They are also used to prevent and relieve colic, head or chest cold and relieve cough. Also, the plant is used for the treatment of liver disorders and as a chewing stick[1].

Garcinia kola and other members of the genus are known to elaborate a complex mixture of phenolic compounds including biflavonoids, xanthones and benzophenones[2-4]. The biflavonoids also possess anti-inflammatory, antimicrobial, antiviral and anti-diabetic properties[5].

The inclusion of antibiotics in livestock rations has been discouraged; this is because of the residual effect in livestock products and development of resistant strains of micro-organisms to drug therapy[6].

The search for alternative substances to antibiotics in livestock feeds leads to the investigation of whether Garcinia kola could be used as growth promoter because of its medicinal properties. The present report investigated the possible use of Garcinia kola as growth promoter in broiler chickens.

MATERIALS AND METHODS

Preparation of materials: They were sliced and air-dried; the dried seed were ground into powdered form.

Experimental animals and diet: Seeds of *G. kola* were purchased from local market in Ogbomoso 200 broiler chicks of Anak strain were purchased from Zartech farms, Ibadan. 20 birds were put in a replicate and subjected to 5 different diets. Each diet were replicated twice, making a total of 40 chicken per diet.

Group I served as control containing 0% of *G. kola*, Group II, III, IV and V were given 2.5% (w/w), 5% (w/w), 7.5% (w/w) and 10% (w/w) of *G. kola*, respectively.

All animals were housed under identical conditions of temperature and humidity while feed and water were made available ad-libitum, necessary vaccinations and medications were administered. The experiment lasted 4 weeks.

Sample collection: The average initial weight of the birds were take on arrival and the body weight gain were taken on weekly basis, the replicate were usually weighed together and the value divided by the number of birds to get the average weight of birds from which the average initial weight is subtracted to give the average body weight gain in grammes.

Average quantity of feed consumed per bird per week was recorded for each treatment by subtracting the leftover from quantity of feed measured per diet per week.

Corresponding Author: O.S. Adedeji, Department of Animal Production and Health, P.M.B. 4000, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria

Other parameters measured are the feed efficiency which is the feed intake per week (g) divided by weight gain per week (g), feed conversion ratio, average conversion ratio, percentage mortality and carcass characteristics were also measured. All data collected were subjected to one way analysis of variance[7] and significantly different treatment means were compared using multiple range test[8].

Normal range (source) Mituika and Rawnsely[9].

RESULT AND DISCUSSION

The progressive variation between dietary treatment with respect to percentage crude protein, dry matter and crude fibre was accounted for by the comparative differences of the values of the feed inclusion in *Garcinia kola*.

In Table 1, the average feed intake was significant ($p<0.05$) different with highest feed intake from Group III and IV and the least from Group I.

In Table 2, the average weight gained by birds are significantly ($p<0.05$) different, with the highest value coming from birds fed 10% (w/w) *G. kola* and the least from those fed 7.5% (w/w) *G. kola*.

In Table 3, feed efficiency was also significantly ($p<0.05$) different, especially the values obtained form diets I, II and V which are higher than those from diets III and IV.

In Table 4, the heamotological values for the groups are within the normal literature ranges for experimental birds[9]. This suggest that inclusion of *G. kola* in the levels carried out for the investigation can be beneficial to the birds, but the WBC were proliferated, and the lymphocythes in particular were also significantly high.

Table 1: Average Feed Intake (g/bird)

Age in Weeks	Feed intake Groups I	Groups II	Groups III	Groups IV	Groups V	SEM
1	132.32	127.50	127.25	126.25	102.50	2.30
2	266.92	260.00	276.67	266.75	280.00	2.78
3	220.55	252.50	276.32	250.50	257.50	2.50
4	161.32	262.50	276.30	308.80	262.50	1.92
Total	781.11	902.50	953.64	952.30	882.50	9.23
Mean	195.28^{c}	225.63^{b}	238.41^{a}	238.08^{a}	220.63^{b}	2.31

abc; means in the same row not followed by the same superscripts are significantly ($p<0.05$) different

Table 2: Average Body Weight Gain (g/bird)

Age in Weeks	Feed intake Groups I	Groups II	Groups III	Groups IV	Groups V	SEM
Initial weight		40.00	40.00	40.00	42.50	0.02
Week 1	42.50	112.43	109.25	107.50	102.50	1.11
Week 2	106.58	236.96	226.32	225.00	224.99	2.47
Week 3	236.96	297.53	226.49	278.75	278.75	0.01
Week 4	327.23	281.25	347.52	231.31	364.44	0.02
Total	938.98	928.17	909.58	842.56	970.68	3.36
Mean	234.75^{b}	232.04^{b}	227.40^{b}	210.64^{a}	242.67^{a}	0.91

a.b.c; means in the same row not followed by the same superscripts are significantly ($p<0.05$) different

Table 3: Feed Efficiency Ratio

Age in Weeks	Feed intake Groups I	Groups II	Groups III	Groups IV	Groups V	SEM
1	1.25	1.11	1.17	1.18	1.00	0.03
2	1.13	1.16	1.21	1.19	1.16	0.02
3	0.82	0.85	0.96	0.90	0.93	0.01
4	0.68	0.69	0.76	0.87	0.72	0.02
Total	3.88	3.81	4.10	4.14	3.81	0.08
Mean	0.97^{a}	0.95^{a}	1.03^{b}	1.04^{b}	0.95^{a}	0.02

a, b: means in the same row not followed by the same superscript are significantly ($p<0.05$) different

Table 4: Effects of *Garcinia kola* Inclusion on Heametological Parameters of Broiler Chicks

Parameters	Groups I	Groups II	Groups III	Groups IV	Groups V	Literature Values Range
PCV %	25^{b}	28^{a}	21^{c}	27^{a}	20^{b}	29.9
Hb (g dl)	8.1^{b}	9.0^{a}	8.5^{b}	8.3^{b}	7.0^{c}	9.8
Rbc ($x10^{6}/m^{2}$)	3.8^{b}	3.5^{c}	3.7^{b}	4.0^{a}	3.8^{b}	2.70
WBC ($x10^{3}/m^{2}$)	3.8.4^{c}	80.0^{a}	60.0^{b}	62.0^{b}	30.0^{c}	18.9
Differential WBC						
Lymphocytes ($x10^{3}/m^{2}$)	53^{c}	67^{a}	60^{b}	50^{c}	6.1^{b}	12.1-64.2
Monocytes	1.8^{b}	3^{a}	2^{b}	2^{b}	2^{b}	0.08-0.42
Eosnophils	5^{c}	6^{b}	7^{a}	5^{c}	5^{c}	1.37-7.25
Neutrophils	30^{b}	34^{a}	28^{c}	30^{b}	30^{b}	4.57-24.2

Means in the same row not followed by the same letter superscrips are significant different ($p<0.05$)

This suggests that *G. kola* was responsible for the antimicrobial activity of the feed. As lymphocytes were scientifically known to play key role in the immune defense system of the body. This they do by forming antibodies against antigens in the blood circulation or in the development of cellular Immunity[10].

Also, mortality was not recorded in groups II and V which reveals its usefulness in the treatment of bacterial, viral and other parasitic infections.

However, it was observed that at 2.5% (w/w) inclusion level of *G. kola* in broiler diet, better daily feed intake, body weight gain and feed efficiency were obtained.

In view of the fact that *G. kola* is not consumed as staple food unlike other grains, the inclusion of *G. kola* in broiler diet should be encouraged as this will minimize the total dependence on synthetic drugs as growth promoter.

Further investigations should be carried out on *G. kola* show the effectiveness of its anti-microbial and anti-viral properties in poultry industries.

REFERENCES

1. Iwu, M.M., 1993. Handbook of African Medicinal Plant. CRC Press. Boca Raton. Ann Arbor London. Tokyo, pp: 83-184.
2. Locksey, H.D., 1973. Forsch Chem. Org. Naturist, 30: 207.
3. Rama Rao, A.V.G., G. Ven katswamy and A.O. Penolse, 1980. Tetrahenzion Lett.
5. Iwu, M.M., 1986. Plant flavoniods in Biology and Medicine (Eds.) V. cody, E. middleton, J.B. Hardon and Alan r. Liss, New York, pp: 485.
6. Oyekunle, M.A. and M.O. Owonikoko, 2002. Anti microbial drug usage for poultry production within local government areas in Ogun State Nig. J. Anim. Prod., 29: 113-120.
7. Steel, R.G.O. and J.H. Torrie, 1980. Principal and procedures of statistics. A biometricals Approach 2nd ed. McGraw – Hill Book Co. New York..
8. Duncan, D.B., 1955. Multiple range and multiple F. test biometrics 11: 1-42.
9. Miturka, B.M. and H.M. Rawnsely, 1977. Clinical, Biochemical and Heamatological reference values in normal experimental animal. Mason publishing USA Inc. N. Y , pp: 11-174.
10. Frandson, R.D., 1981. Anatomy and physiology of farm animals, Lea and Fabiger, philadephia, pp: 229-238.