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CARCASS CHARACTERISTICS AND SENSORY EVALUATION OF BROILER CHICKENS FED DIETS CONTAINING PHYTOBIOTICS

Shobiye, O.E.,*Irivboje, Y.I., Sobayo, R.A.

Department of Animal Nutrition, Federal University of Agriculture, Nigeria. PMB 2240, Abeokuta, Ogun State, Nigeria
*Department of Animal Breeding, Federal University of Agriculture, Abeokuta, Nigeria

Corresponding author: Shobiye, O.E. e-mail: lawalo33@yahoo.com, +2348060882395

Abstract
This study was designed to determine the carcass characteristics and sensory evaluation of broiler chicken fed diet containing phytobiotics. A total of 180 day-old Arbor Acre broiler chicks were used for the study that lasted for 28 days. The birds were weighed and randomly divided into six treatment groups, each consisting of three replicates with 10 birds per replicate. The data collected were subjected to analysis of variance using a completely randomized design. Six experimental diets were formulated to include the control diets (0 %), Ginger (0.5 %), Pawpaw leaf (0.5 %), Moringa (0.5 %), Turmeric (0.1%) and Oxytetracycline (0.05 %) labelled T1, T2, T3, T4, T5 and T6 respectively. There were no significant differences (P>0.05) in live weights, dressing percentage and breast percentage between treatment. Diets containing moringa had the highest significant value (p<0.005) of thigh weight .It was concluded that live weight, dressing percentage and breast percentage across the treatments were not influenced by phytobiotics. Birds fed diets containing ginger improved the flavour and tenderness of meat.

Key words: Phytobiotics, proximate composition, performance, carcass characteristics, sensory evaluations

INTRODUCTION
The use of antibiotics as antimicrobial growth promoter (AGP) has been widely practiced in animal production. The benefits of AGP in improving weight gain and feed efficiency of broiler chicken are well established (Butaye *et al*., 2003). However, the use of AGP has been shown to result in the development of drug-resistant bacteria (Alexander *et al*., 2008). The drug-resistant bacteria infect humans via food chain and thus it is a public concern (Torres *et al.*, 2010). This has led to the European Union ban of most antibiotics as AGP in animal production. Herbs and medicinal plants also present a potential alternative to AGP. Prominent among these plants are Moringa (*Moringa oleifera),* Pawpaw (*Carica papaya*) leaf, Ginger rhizome (*Zingiber officinale*), and Turmeric (*Curcuma longa*). A large variety of these plants have properties which could potentially improve feed intake, digestion, feed conversion and body weight gain (Ertas *et al*., 2005). Thus, the objective of this study was to evaluate the effects of phytobiotics on carcass characteristics and sensory evaluation of broiler chickens.

Materials and methods
The study was carried out at the Directorate of University Farms (DUFARMS) of the Federal University of Agriculture, Abeokuta. A total of 180 day–old Arbor-acre birds were weighed and randomly divided into six groups, each consisting of three replicates with 10 birds per replicate. The data collected were subjected to analysis of variance using a completely randomized design. The birds were housed under same experimental conditions of temperature and humidity. Fresh leaves of Moringa and Pawpaw leaves were harvested from the Directorate of University Farms of the Federal University of Agriculture Abeokuta. The harvested leaves were spread under shade for 7 days to dry and then milled using 2 mm sieve and added to the formulated diets at 0.5% each. Ginger and

Turmeric were sundried for 7 days and ground manually. The experimental diets were offered to each of the six treatment groups and clean water was made available *ad libitum*. The feeding trial lasted for twenty-eight days. At the end of 28 days feeding trial, two birds per replicate were randomly selected from each experimental treatment, weighed, slaughtered and eviscerated. The cut -parts were expressed as percentages of live weight.

Sensory Attributes of Meat

The sensorial evaluation were performed according to Dutcosky (2007). The evaluation of samples of cooked meat were assessed by 7 panelists. For sensorial test trial, a hedonic scale from 1-9 (1:dislike extremely;2:dislike very much;3:dislike moderately;4:dislike slightly;5:intermediate;6:like slightly;7:like moderately;8:like very much;9:like extremely) was used to evaluate appearance, flavour, juiciness and tenderness of meat.

Statistical Analysis

Significant treatment means were subjected to analysis of variance (ANOVA) using statistical analysis system package (2000). Means were separated using Duncan multiple range test.

Table 1: Composition (%) of Experimental Diets (Finisher Phase)

Ingredient	T1	T2	T3	T4	T5	T6
Maize	57.10	57.10	57.10	57.10	57.10	57.10
Fish Meal	2.00	2.00	2.00	2.00	2.00	2.00
Soyabean meal	23.00	23.00	23.00	23.00	23.00	23.00
Groundnut cake	4.00	4.00	4.00	4.00	4.00	4.00
Wheat offal	10.00	9.50	9.50	9.50	9.90	9.95
Bone meal	2.00	2.00	2.00	2.00	2.00	2.00
Oyster shell	1.00	1.00	1.00	1.00	1.00	1.00
Lysine	0.20	0.20	0.20	0.20	0.20	0.20
Methionine	0.20	0.20	0.20	0.20	0.20	0.20
Premix	0.25	0.25	0.25	0.25	0.25	0.25
Salt	0.2 5	0.25	0.25	0.25	0.25	0.25
Ginger	-	0.50	-	-	-	-
Pawpaw leaf	-	-	0.50	-	-	
Moringa	-	-	-	0.50	-	-
Turmeric	-	-	-	-	0.10	-
Oxytetracycline	-	-	_	-	-	0.05
Total	100.00	100.00	100.00	100.00	100.00	100.00
Calculated analysis (%)						
Crude protein	20.59	20.58	20.65	20.17	20.58	20.59
Crude fibre	3.67	3.66	3.65	3.74	3.67	3.67
Metabolizable energy (kcal/kg)	2932	2930	2924	2944	2930	2932

**1 kg premix contains Vit. A: 10,000,000 IU, Vit. D3: 2,500,000 IU, Vit. E: 20,000 mg, Vit. K3: 3000 mg, Vit. B: 30,000 mg, Vit. B3: 3000 mg, Vit. B2: 7000 mg, Vit. B6: 5000 mg, Vit. B12: 25 mg,*

Pantothenic acid: 10,000 mg, Folic acid: 800 mg, Biotin: 50 mg, Manganese: 80,000 mg, Iron: 40,000 mg, Zinc: 60,000 mg, Copper: 8000 mg, Cobalt: 250 mg, Iodine: 1000 mg, Selenium (1%), 150 mg, Choline: 200,000 mg and Antioxidant: 100,000 mg.

Results and discussion

The proximate composition of the ginger, pawpaw leaf, moringa and turmeric used is shown in Table 2. The dry matter value of moringa leaves (95.7 %) was higher than the values reported by Olugbemi *et al* (2010) and Mutayoba *et al* (2011). They reported dry matter values of 93.7% and 87.20% respectively. The crude protein, ash content of pawpaw leaf meal in this study was lower than the crude protein (30.12%) and ash content (8.45%) reported by Onyimonyi and Oni (2009). The relative low crude fibre of Moringa makes it a potential feedstuff for monogastric .A number of factors have been identified for different proximate values for plants which include time of harvest, stage of maturity of the plant and genetic factors. On the other hand the dietary supplementation of *moringa oleifera* leaf meal did not significantly ($p>0.05$) affect live weight, dressing and back percentage. Birds fed diets containing moringa had the highest value of thigh proportion (11.89) which is contrary to result of Aqeel *et al* (2018). There were significant differences ($p<0.05$) in meaty flavour and tenderness. Birds fed moringa based diets had the highest value of tenderness (7.38) while birds fed diet containing ginger had the highest significant value of meaty flavour (7.71) and the least value was found in birds fed with pawpaw leaf diet. According to Liu and Stouffer (1995), the three major sensory properties that interfere with meat quality evaluation are general aspect, texture and flavour.

Table 2: Proximate composition of phytobiotics (Dry matter basis %)

Composition (%)	Ginger	Pawpaw leaf	Moringa	Turmeric
Dry matter	94.00	89.10	95.7	98.6 1
Crude protein	8.00	28.80	26.01	7.83
Crude fibre	21.85	13.15	9.02	12.88
Ether extract	5.50	1.36	2.14	4.61
Ash	6.30	7.45	7.83	49.31
NFE	52.20	24 .09	60.53	65.18

Table 3: Effect of phytobiotics on carcass characteristics of broiler chickens

Parameters	Phytobiotics						SEM
	Control	Ginger	Pawpaw leaf	Moringa	Turmeric	Oxytet	
Live Weight(g)	2450.41	2516.67	2500.00	2350.67	2450.00	2300.00	35.99
Dressed Weight (%)	90.13	88.62	88.55	86.53	90.27	90.42	1.16
Carcass(%)	77.69	77.25	78.99	76.09	82.31	80.27	1.33
Thigh (%)	7.89^{b}	10.89^{a}	10.42^{ab}	11.89^{a}	10.55^{ab}	10.93^{a}	0.42
Back (%)	15.52	14.61	18.09	15.66	14.99	16.54	0.42
Breast (%)	23.28	20.89	23.64	21.30	25.04	22.54	0.49

Table 4: Sensory evaluation of broiler chicken meat (1-9 point hedonic scale)

Parameters	Phytobiotics						SEM
	Control	Ginger	Pawpaw leaf	Moringa	Turmeric	Oxytet	
Colour	7.24	6.86	7.05	7.19	6.52	6.38	0.128
Juiciness	7.24	7.10	6.10	7.00	6.62	6.62	0.158
Meaty Flavour	7.24[a]	7.71[a]	6.24[b]	6.57[ab]	7.33[a]	6.76[ab]	0.140
Tenderness	7.19[a]	7.24[a]	6.76[ab]	7.38[a]	6.90[ab]	6.19[b]	0.138
Saltiness	5.43	5.33	5.38	5.24	6.05	5.38	0.152
Overall Flavour	6.76	7.43	7.24	6.62	7.29	6.76	0.109
Overall Acceptability	7.48	7.10	6.67	7.10	7.43	6.81	0.115

[a,b,c] = Means on the same row with different superscripts differ significantly (P<0.05) Oxytet = Oxytetracycline

Conclusion and recommendation

It was concluded that adding phytobiotics to the diets of broiler chickens had no influence on the live weight of broiler chickens but diets containing ginger improved the flavour and tenderness of meat. Future research should concentrate on the standardization which will allow optimal use of phytobiotics in feed or water for the benefit of poultry farmers.

References

Alexander, T. W., Yanke L. J, Topp, E., Olson, M. E., Read, R. R., Morck, D. W. and McAllister., T. A. (2008). Effect of subtherapeutic Administration of Antibiotics on Prevalence of Antibiotic Resistant *Escherichia coli* Bacteria in Feedlot cattle. *Applied and Environmental Microbiology 74(14), 4405-4416, 2008*

Aqeel, Y.A., Nihad ,A., Rabia, J.A., Ali, M.A., Yasser, J.J. (2018).Effect of dietary supplementation with varying levels of Moringa oleifera Leaf Meal on the Productivity and Carcass Characteristics of Broiler Chickens. *International Journal of Poultry Science, 17(11):536-542,2018.*

Butaye, P., Devriese, L. A. and Haesebrouck, F (2003). Antimicrobial growth promoters used in animal feed: Effects of less well-known antibiotics on gram positive bacteria. Clinical. *Microbiology. Review., 16:175-188.*

Dutcosky S.D. (2007). Analise sensorial de alimentos.Curitiba : Editora Champagnat, 2nd edition.239

Ertas, O. N., Guler, T., CifticiI, M., Dalkili, Ç. B. and Simsek, Ü.G. (2005). The effect of an essential oil mix derived from oregano, clove and anise on broiler performance. *International Journal of Poultry Science 4 :879-884.*

Gray, J. I., Gomaa, E. A., and Buckley D. J. (1996). Oxidative quality and shelf life of meats. *Meat Science* 43:111-123.

Mutayoba, S. K., Dierenfeld, E., Mercedes, V. A., Frances, Y. and Knight, C. D. (2011). Determination of chemical composition and antinutritive components for Tanzanian locally available feed ingredients. *International Journal of Poultry Science, 10:350-357*

Olugbemi, T. S., Mutayoba, S. K. and Lekule, F. P. (2010). *Moringa oleifera* leaf meal as a hypocholesterolemic agent in laying hen diets. *Livestock Research for Rural Development* 22 (4)

Onyimonyi, A.E and Onu, E.(2009). An assessment of Pawpaw Leaf Meal as protein ingredient for finishing broiler. *International Journal of Poultry Science, 8(10):995-998*

SAS Institute. (2000). SAS/STAT(R) Inc. User's Guide, Version 9, SAS Institute, Inc. Cary, NC

Torres, C., Moreno, M.A., and Zarazaga, M. (2010). Prudent use of antimicrobial agents: Not just for humans. *Journal of Enfermedades. Infecciosas. Microbiol. Clinica,* 28:668-671.