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RESPONSE OF BROILER CHICKENS ORALLY ADMINISTERED VARYING LEVELS OF UNDILUTED GINGER (*Zingiber officinale*) EXTRACT

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Abstract

The study was conducted to evaluate the response of broiler chickens orally administered varying levels of undiluted ginger extract. A total of 200 day-old broiler chicks in completely randomized design arrangement were used for the experiment. The chicks were allotted randomly into five treatments, T1 (control group without commercial antibiotic and undiluted ginger extract), T2 (commercial antibiotics oxytetracycline (0.5g/l) alone as positive control) T3 (0.50mls concentrated ginger juice), T4 (1.00mls concentrated ginger juice) and T5 (1.50mls undiluted ginger extract). Each treatment was replicated four times, with 10 birds par replicate. The undiluted ginger extract was orally administered to the birds weekly. Parameters measured were feed intake, body weight, body weight gain and feed conversion ratio of the broiler birds. The results showed that the broilers orally administered varying levels of undiluted ginger extract significantly ($P < 0.05$) had effect on feed intake (T1 and T2 were 4159.10g and 4066.57g respectively while T3, T4 and T5 were 4266.28g, 4507.96g and 4593.21g respectively), body weight (T1 and T2 were 2325g and 2200g respectively while T3, T4 and T5 were 2425g, 2500g and 2592g respectively) and body weight gain (T1 and T2 had 304.25 and 269.23 respectively while T3, T4 and T5 had 283.81g, 315.95g and 318.24g respectively) while feed conversion ratio were not significantly affected ($P > 0.05$). It was concluded that orally administered undiluted ginger extract to broiler chicken at 1.5ml, improved the performance of the broiler birds.

Keywords: Response, Oral administration, Ginger.

Introduction

One of the natural alternatives to antibiotic which has been found to increase performance in poultry is ginger (Dieumou *et al.*, 2009). Ademola *et al.* (2004) stated that Ginger possesses a mixture of three major chemical components gingerols, zingerone and shogaols which may be responsible for its different biological activities such as antibacterial, antidiarrheal, antifungal, antioxidants, and as a growth promoter. The preference for lean meat by most consumers than fatty meat has also encouraged the use of ginger in broiler production. Habibollah *et al.* (2013) reported decrease abdominal fat in broiler chickens fed with diet containing ginger. Research conducted in-vitro shows that ginger extract might control the quantity of free radicals and the peroxidation of lipids and have anti-diabetic properties (Morakinyo *et al.*, 2011). Safa *et al.* (2014) reported the highest percentage of abdominal fat within the control and that the higher the inclusion of ginger in the diet the lesser the fat. Arkan *et al.*, (2012) also reported the use of ginger as a feed additive for performance enhancement in broiler production. However, the possibility of achieving a better enhanced performance by using a better way of administering ginger other than as a feed additive has been speculated (Arkan *et al.*, 2012). This is because of increase feed or water wastage because of factors that could be operating in a broiler house that reduce apparent feed consumption and so lead to an incorrect picture of feed efficiency and flock performance (Arkan *et al.*, 2012). This wastage of ginger when administered to birds either through drinking water or feed has led to the determination of the actual quantity that made ginger effective in broiler production difficult to be ascertain. This study therefore is designed to evaluate the response of broiler chickens orally administered varying levels of undiluted ginger extract.



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Materials and methods

Study site

The experiment was conducted at the poultry unit of Animal Production Department Teaching and Research Farm Gidan Kwano campus, Federal University of Technology Minna, Niger State. Minna town is the capital of Niger state, north central Nigeria.

Source and preparation of undiluted ginger extract

The fresh ginger rhizomes was sourced from Kure market in Minna, Niger State. The fresh Ginger rhizomes were washed with clean water to remove dirt and debris, peeled and sliced into pieces and ground into mash using a blender (Polystar electric blender, Model PV-BL999B. The mash was put into an extractor to squeeze out the undiluted ginger extract. The drained ginger extract was stored in a bottle and kept in a refrigerator at 4⁰ C until when needed as recommended by Joseph *et al.* (2015)

Experimental diet

The diet was formulated and compounded with protein and energy content of 24% CP and 3000Kcal/kg, respectively. This was fed single phase.

Experimental design, data collection and data analysis

A total of 200 day-old broiler chicks in completely randomized design arrangement was used for the experiment. The broiler chicks were allotted into five treatments and four replicates each. Treatment one was the control with no administration, treatment two was orally administered with tetracycline while treatments three, four and five were orally administered with undiluted ginger juice. Data collected were feed intake, body weight, body weight gain and feed conversion ratio. The Statistical package for social science (SPSS,2016) was used to compile the data collected during the study and were analysed using one-way ANOVA. Means were compared where there is significant difference using Duncan multiple range test (IBM Corporation, 2016).

Management of Experimental Birds

Ten (10) birds randomly allocated into each replicate were weighed and their initial body weight documented. Feed was weighed and served on daily basis and mortality was recorded. Birds were weighed weekly to determine body weight and weight gain. Feed and water was served *ad libitum* during the entire experimental period of eight (8) weeks. Lightening system was provided throughout the period using solar to allow for *ad libitum* feeding. The birds were vaccinated against Newcastle disease and infectious bursal disease. They were also given curative treatment for coccidiosis.

Results

The proximate composition of undiluted ginger extract showed that it contained 3440kcl/kg and had crude protein of 5.25% as showed in table 1. Table 2 showed the percentage composition of experimental diet.

Table 1. Proximate composition of undiluted ginger extract

Parameter	quantity (%)
Ash(%)	2.87



Moisture Content	(%)	89.58
Fat(%)		0.84
Crude Protein(%)		5.25
Fiber(%)		0.00
Nitrogen Free Extract(%)		1.46
Metabolizable Energy (kcal/kg)		3440

Response of broiler chickens orally administered varying levels of undiluted ginger extract on feed intake, final body weight and weight gain in table 3 showed that the feed intake from T3, T4 and T5 were significantly ($p>0.05$) improved. The body weight and body weight gain for T4 and T5 were significantly ($p>0.05$) different compared with other T1, T2 and T3 group.

Table 2. Percentage composition of experimental diet

Ingredients	Quantity (%)
Maize	50.00
Full fat soya beans	38.50
Fish meal	1.50
Rice offal	5.00
Bone meal	3.80
Lysine	0.40
Methionine	0.20
Vitamin premix	0.30
Salt	0.30

Table3. Response of broiler chickens orally administered varying levels of undiluted ginger extract

Parameter (g)	T1	T2	T3	T4	T5	SEM	LS
Initial weight	46.73	46.48	46.63	46.65	46.60	0.38	Ns
Final weight	2325 ^{ab}	2200 ^b	2425 ^{ab}	2500 ^{ab}	2592 ^a	49.16	*
Weight gain	304.25 ^{ab}	269.23 ^b	283.81 ^{ab}	315.95 ^a	318.24 ^a	70.83	*
Feed intake	4159.10 ^b	4066.57 ^b	4266.28 ^{ab}	4507.96 ^{bc}	4593.21 ^c	59.40	*
Feed conversion ratio	1.38	1.51	1.17	1.44	1.49	0.07	Ns

T1= Control (zero drenching) ; T2=0.50ml (tetracycline) ; T3= 0.50ml(undiluted ginger extract); T4= 1.00ml(undiluted ginger extract) ;T5=1.50ml(undiluted ginger extract) SEM= Standard error of the mean;LS= Level of significance; abc=Means in the same row with the same superscripts are not significantly different ($P>0.05$); *= Significant ($P<0.05$);NS= No Significant difference.

Discussion

Response of broiler chickens orally administered varying levels of undiluted ginger extract at 0.50ml, 1.00ml and 1.50ml in table 3 showed that treatment five having 1.5ml of ginger extract consumed more (4593.21g). Treatment four also had the second highest feed intake 4507.96g the least feed intake was

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recorded in treatment one (4159.10g) and two (4066.57g) respectively. On the final body weight, Treatment five gave the highest value (2592g) against Treatment one and Treatment two which had the least value (2325g and 2200g). The feed intake which has translated into better body weight and body weight gain in treatment five and four and this could be attributed to its different biological activities such as antibacterial, antidiarrheal, antifungal, antioxidants, and as a growth promoter and are in agreement with Dieumou *et al.* (2009) and Arkan *et al.* (2012).

Conclusion

Undiluted ginger extract orally administered to broiler chicks up to 1.50ml stimulated the birds to consume more and that resulted in the highest body weight and body weight gain.

Recommendation

I recommend that more research should be carried on the effect of orally administering higher quantity (above 1.50ml) of the undiluted ginger extract on broiler chicken feed intake and weight gain.

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