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EFFECT OF STRAIN AND AQUEOUS ADMINISTRATION OF GINGER EXTRACT ON SENSORY PROFILE OF BROILER CHICKEN MEAT

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ABSTRACT
The research was carried out to evaluate the effect of strain and administering concentrated ginger extract on sensory properties. A 270 day old chicks (Arbor acre Plus, Cobb 500 and Ross 308) were used in a completely randomized design experiment. The birds were fed a single-phased diet (23.34% CP; 2948.05 ME kcal/kg). The birds were randomly divided into three groups of 90 birds each, designated as groups T1, T2 and T3. The chicks in each group were further divided into 3 treatments with 3 replicates of 10 chicks. The experiment lasted for 8 weeks. The birds were administered a levelled table spoonful of Oxytetracycline® in 2 litres of water as recommended by the manufacturer (control), 4% and 6% aqueous ginger extract (treatment 2 and 3) in drinking water, respectively. Samples were collected from the breast meat at the end of the experiment to evaluate the sensory properties. The results showed that strains and ginger supplement had no effect ($p>0.05$) on all the sensory properties measured. However, treatment three (3) recorded the highest value for all parameters measured within strain while Treatment two (2) recorded the highest value for all parameters measured among the birds administered varying level of ginger extract except the value for colour which recorded lower value than treatment three (3). This study therefore suggests that ginger extract could be included in the diet of broiler chickens up to 6% for improved sensory properties of broilers birds.
Keywords: Sensory properties, antibiotics, ginger, strains.

INTRODUCTION
Poultry species including turkey, goose, fowl, guinea fowl and duck are domesticated birds that are raised primarily for the purpose of egg or meat production (Oluyemi and Roberts, 2007). They are very popular and vital sources of animal protein consumed all over the globe without any religious and or cultural barriers. Antibiotics have been the most common feed additives used in time past. However, the use of synthetic antibiotics is being regulated because of the development of resistant microorganisms and their effect on human health (Yahya *et al*., 2014; Joseph *et al*., 2015).
In recent times, herbs and spices have gained useful applications in broilers chicken production. This can be attributed to their inherent antimicrobial, growth promoting and fat reducing properties. Ginger is one of the spices recommended as a natural growth enhancer; it contains several compounds such as shogaols, gingerdione, gingerol, phenolic, and gingerdiol (Zhao *et al*., 2011). Some of the essential phytochemicals in ginger are implicated for improved weight gain and impart pharmacological benefits on broiler chickens health (Ali *et al*., 2008).
The use of ginger as substitute for antibiotic growth promoters is desirable for greater productivity of poultry, increased palatability of feed, nutrient utilization, appetite stimulation, increase in the flow of gastric juice and piquancy to tasteless food (Owen and Amakiri, 2012)
The aim of the study therefore, was to evaluate the effect of administering concentrated aqueous ginger extract on the sensory properties of three strains of broiler chicken.

MATERIALS AND METHODS

STUDY AREA

The research was conducted at the poultry unit of the Department of Animal Production Teaching and Research Farm, Gidan Kwano, Federal University of Technology Minna, Niger State.

Minna is located within latitude 09º 30' and 06º 45' north and longitude 06º 30' and 06º 45' east of the equator. It falls within the Southern Guinea Savanna agro-ecological zone of Nigeria. The mean rainfall varies from 1100 to1600 mm and mean temperature of between 21ºC and 35ºC FMSN, (2015).

Preparation of ginger extract

Fresh ginger rhizomes were thoroughly washed with water to remove the dirt, peeled, and cut into chips. The ginger chips were then ground with a warring blender (Polyster electric blender of model PV-BL999B) into mash. A concentrated ginger juice was then collected from the mash using an extractor. The squeezed juice was stored in a bottle and refrigerated at 4° until the time it was used (Joseph et al., 2015).

Formulation of experimental diet

The chicken diet was formulated to contain a metabolizable energy of 2948.05 kcal/kg with a protein level of 22.34 %. The diet was fed for the whole experiment. The diets were formulated in accordance with the recommendations of the NRC (1994).

Management of the Experimental Birds

A total of 270 day old chicks (Abor Acre Plus, Cobb 500 and Ross 308) were used for the experiment. Before arrival of the birds, the experimental house was washed and fully disinfected. The chicks were randomly shared into three (3) treatments in a Randomized Complete Block Design (RCBD). The chicks in each group were divided into 3 replicates of 10 chicks making 30 birds per treatment. The groupings for each strains were designated as treatment 1, 2, and 3 (T1, T2 and T3). Treatment 1 birds were administered a table spoonful of Oxytetracycline® in 2 litres of water and served as the control. Birds in T2 and T3 were given 4% aqueous ginger extract in 192 mL and 6% aqueous ginger extract in 188 mL of drinking water, respectively. Birds were reared on deep litter system for 56 days. Vaccinations and medications were strictly followed and feed and water were supplied *ad-libitum.*

RESULTS AND DISCUSSIONS

Table 1 shows the strain effect on the sensory properties of broiler chickens administered varying level of aqueous ginger extract. The result showed that there were no significant differences ($p>0.05$) for all the parameters measured. However, treatment three (3) recorded the highest value for all parameters measured followed by treatment two (2) which recorded the higher values than treatment one (1) in juiciness (6.64 %), aroma (6.57 %), appearance (6.40 %) and colour (6.60 %) while treatment one (1) recorded higher values than treatment two (2) in tenderness (7.20 %) and flavour (6.44 %).

Table 2 shows the effect of ginger extract administered at varying level on the sensory properties of broilers chicken. The result showed that there were no significant differences ($p>0.05$) for all the parameters measured. However, treatment two (2) recorded the highest value for all parameters measured except the value for colour (6.67) followed by treatment three (3)) which recorded the higher values than treatment one (1) in juiciness (6.64 %), appearance (6.53 %), flavour (6.49 %) and colour (6.84) while treatment one (1) recorded higher values than treatment three (3) in tenderness (7.16 %) and aroma (6.64 %).

Table 1: Sensory evaluation of the different breeds of broiler chicken

PARAMETERS (BREEDS)	T1	T2	T3	SEM	P-VALUE
Overall	7.07	7.17	7.48	0.198	0.301
Tenderness	7.20	6.91	7.42	0.21	0.226

Juiciness	6.36	6.64	7.04	0.237	0.124
Aroma	6.51	6.57	6.89	0.221	0.436
Appearance	6.33	6.40	6.84	0.229	0.232
Flavour	6.44	6.60	6.93	0.235	0.192
Colour	6.51	6.60	6.89	0.235	0.495

Keys:
SEM= standard error of mean

T=treatment

T1=Abor acre plus

T2=Ross 308

T3=Cobb 500

Table 2. Sensory evaluation of broiler chickens administered varying levels aqueous ginger extract

PARAMETERS (GINGER)	T1	T2	T3	SEM	P-VALUE
Overall	7.11	7.49	7.14	0.198	0.325
Tenderness	7.16	7.36	7.02	0.21	0.529
Juiciness	6.47	6.93	6.64	0.237	0.376
Aroma	6.64	6.82	6.51	0.221	0.607
Appearance	6.24	6.80	6.53	0.229	0.232
Flavour	6.42	6.84	6.49	0.235	0.395
Colour	6.47	6.67	6.84	0.235	0.522

Keys:
SEM= standard error of mean

T=treatment

T1=oxytetracycline (Control)

T2=ginger at 4%

T3=ginger at 6%

The sensory properties of the different strains of broiler chickens were significantly influenced by the aqueous ginger extract administered. Broiler chickens in treatment three (3) recorded the highest value for all parameters measured for sensory properties of the three different breeds administered aqueous ginger extract.

A similar observation of better sensory properties was made by (Owen and Amakiri, 2012) on broiler chickens administered ginger.

Ginger extract administered at varying level did not significantly affect the sensory properties of broilers chicken. Treatment two (2) recorded the highest value for all parameters measured except the value for colour which recorded lower value than treatment three (3). However, treatment three (3) which recorded higher values than treatment one (1) in juiciness, appearance, flavour and colour recorded less value than treatment one (1) in tenderness and aroma. This could be linked to the inherent antimicrobial, growth promoting and fat reducing properties of ginger.

Conclusion

Ginger effect on the sensory properties of the different strains of broiler chicken did not affect the preference of consumers as there were no difference across the three strains checked.

It was concluded that aqueous ginger extract could be use up to 4% level of inclusion in the drinking water of broiler chickens to improve sensory properties of broiler chicken meat to cut cost of production and produce lean meat which is less fatty and more desirable.

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