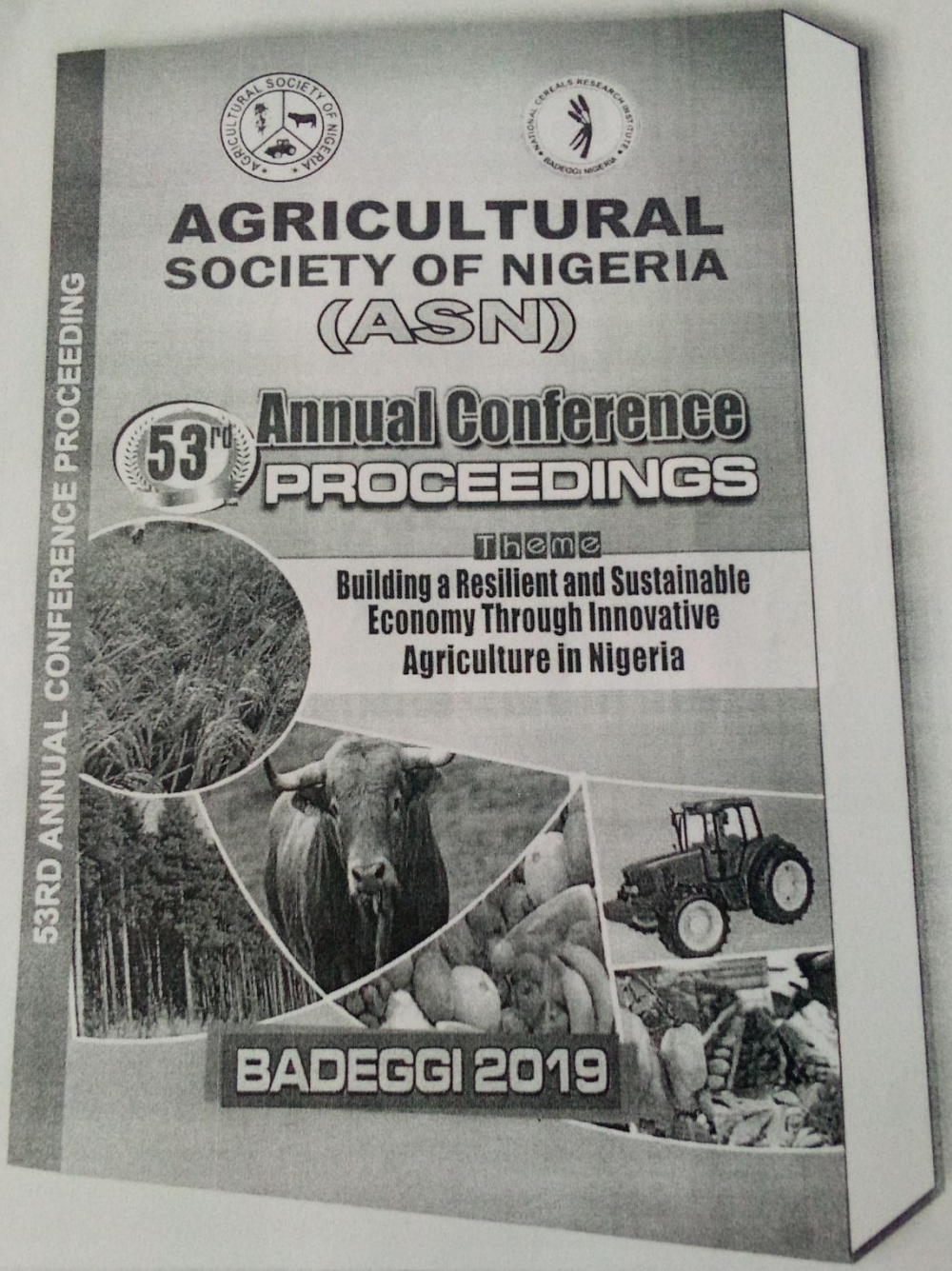

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ANIMAL SCIENCE AND FISHERIES

ASN 53rd Annual Conference Proceedings (Sub-Theme: Animal Science and Fisheries)

Effects of feeding Diets containing Capsaicin fromred hot pepper (*Capsicum annum*) on the growth performanceof Marshal Broiler Chickens

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Abstract
The experiment was conducted to study the effectsof feeding diets containing different levels of capsaicin from red hot pepper (Capsicum annum) on the growth performance of Marshal broiler chickens. One hundred and twenty(120) day old unsexed Marshal broiler chicks were assigned randomly into four treatments replicated three times with ten birds per replicateusing deep litter system of management. Red hot pepper was included at 0.00%, 1.00%,1.25% and 1.50% representing T1, T2, T3 and T4, respectively. The red hot pepper was added to a commercial broiler starter diet.Parameters measured were average weekly feed intake, average weekly body weight, average weekly body weight gain and average weekly feed conversion ratio of the broiler birds. The results showed that the consumption the of higher levels of capsaicin significantly ($P<0.05$) affected feed intake and body weight while body weight gain and feed conversion ratio were not significantly affected ($P>0.05$). It was concluded that intake of capsaicin, improved the performance of the marshal broilerbirds fed red hot pepper-based diets.

Introduction

Meat is highly required for human consumption as animal source of protein. To meet with the demand of animal protein supplies in this rapidly growing populationrequires the involvement of science and art of management and nutrition. Broiler chicken meat is one of the most accepted meatsworldwide and thus, the use of dietary additives has become a thing of concern. Synthetic additives are commonly used by farmers to enhance growth of broilers.Capsaicin in red hot pepper presentsa reliable alternative to synthetic (antibiotic) growth promoters because of its high quantity of bioactive substances. Research has shown increase in body weight and best feed conversion ratio when using herbal plants in broilers diets (Great, 2003). These herbs are known spices which improves digestibility inspite of age (Folukeet *al.*, 2013). Red hot pepper is a phytoadditive which has antibacterial, antimicrobial, anticancer, and antioxidant properties and improves the production performance of poultry (Prabhakaran *et al.*, 2016). The inclusion of red hot pepper in broiler's diet has been reported to have enabled weight gain, feed intake and feed conversion ratio of broilers, depressed the cholesterol, triglyceride, glucose concentration and, decrease haemoglobin concentration in broiler's blood plasma when fed at 0.50, 0.70 and 1.00% (Galib *et al.*, 2011; Aghil*et al.*, 2013; Ndelekwutee*t al.*, 2015). This is probably due to the effect of the active ingredient in the pepper called capsaicin. Spices as additives have been studied to improve the apparent feed digestibility when fed to the broilers in their diet. No differences were observed in the weight of the organs and small intestine. The effect of the additive on performance had slightly improved the performance and the difference were not significant (Hernandez *et al.*, 2004).Reports onthe use of higher inclusion rates (>1.00%) of red hot pepper (which translate to higher quantity of capsaicin) in broilers dietsand its effect on growth performanceis scarce. Hence this research work is aimed at exploring the performance of broiler chickens fed higher inclusion (>1.00%) of red hot pepper in their diets.

Materials and Method

The experiment was conducted at Mike's farm enterprise, Shango, Minna, Niger State. Minna has maximum temperature of 34°, minimum of 23°, humidity is 95% and lies on Latitude 8° 22'N and 11° 30'N and Longitude 3030'N and 70 20'E (Job *et al.*,2014).The experimental birds (120) were purchased from a

commercial farm in Ibadan.For the experiment, a commercial basal starter diet containing 22 % crude protein and 2850 kcal/kg Metabolizable Energy (ME) was used from day 1 until 28 days of age and a commercial basal finisher diet containing 20 % crude protein and 3000 kcal/kg ME was used from 29 days until 56 days of age. The red hot pepper used was purchased fromMinna central market, ground with an electric blender (Polystar electric blender pv-BL999B, Polystar-technologies Fayette County, Georgia, USA).The red hot pepper was chemically analyzed as showed in table 1. The red hot pepper was mixed with the basal diets manually at the rate of 0.00%, 1.00%, 1.25% and 1.50% and fed to the birds. The experimental design used was the completely randomized design(CRD). The birds were vaccinated against Newcastle disease and infectious bursal disease. They were also treated against coccidiosis with Amprolium®.

Parameter measured during the experiment were average weekly feed intake, average weekly body weight, average weekly body weight gain, average weekly feed conversion ratio and the quantity of capsaicin consumed over the experimental periods.

Average Feed Intake was calculated as; Feed served- Feed refused

Average body weight gain = Final body weight - Initial body weight

FCR = Feed intake/body weight gain

The amount of capsaicin consumed per bird during at both phases of the study was evaluated thus;

Amount of capsaicin in red pepper x mean feed intake

Data collected during the study were analyzed using the Statistical Package for Social Science (SPSS,2016) the sources of variation being the red hot pepper fed to the birds. The mean obtained were separated using Duncan multiple range test.

Resultsand Discussion

The result of feeding varying levels of diets containing capsaicin from red hot pepper on the growth performance of Marshal broiler chickens as presented in Table 2.The initial body weight of the marshal broiler chicken did not show any significant ($p<0.05$) difference among the treatment.The weekly feed intake showed that there was significant ($p>0.05$) difference among the treatment on weekly feed intake. Feed intake increased from T1 with 365.19g down to T4 with 430.70g. The control T1 with 0.00% inclusion levels of diets containing capsaicin from red hot pepper in table 2 has the lowest feed intake while the treatment with the highest is T4 with 1.50% inclusionlevels of diets containing capsaicin from red hot pepper. The weekly body weight of the marshal broiler chicken at the starter phase also showed an increment among the treatment. The result indicates a significant ($p<0.05$) difference on the weekly body weight. The control T1 (0.001%) showed the lowest body weight with 294.13g and the highest treatment with body weight is T4 (1.50%) with 331.58g. The weekly body weight gain and the feed conversion ratio at the starter phase showed that there was no significant ($p<0.05$) difference among the treatments.

The weekly body weight of marshal broiler chicken also showed that there is significant ($p>0.05$) effect down the group.At the finishers phase, the control still showed the lowest weekly feed intake of 595.38g and the highest from T4 with 748.67g as there was significant ($p<0.05$) difference between the one fed control diet and those fed diets containing varying levels of capsaicin in red hot pepper. The weekly body weight also show significant ($p>0.05$) different among the group. The group show that the higher the inclusion of capsaicin from red hot pepper into the diet of the broilers the higher the feed intake. The treatment with 1.50% inclusion has the highest feed intake and body weight values.

Results obtained for the productive performance of the marshal broiler chicken at the starter and finisher phase showed that the treatments effect on body weight gain, total feed intake was significantly ($P<0.05$) different during both starter and finisher phase. Birds fed the highest level of diets containing capsaicin contained in red hot pepper (1.50%) revealed significantly ($P<0.05$) the heaviest body weight gain and highest feed consumption as compared to control group T1. It might be due to that, red pepper increases digestion through arousing digestive liquids of stomach and eradication infectious bacteria , These results were in line with the findings of Hossein,(2011) or might be due to that red pepper affects the absorption power, decrease material transit velocity and increase digestive enzymes activity and increased chicks dietary and weight gain.Al-Kassie *et al.*, (2012) who reported that there was highly significant ($P<0.05$) increase in body weight and feed consumption when compared to the control group. This might be due to digestibility characteristics of capsaicin contained in red hot pepper included in the diet and also that red hot pepper is rich in vitamin C which may improve feed consumption that are reflected on body weight improvement.The inclusion of capsaicin contained in red hot pepper on the growth performance of Marshal broiler chickens diet at 1.00%,1.25% and 1.50% in table 1 showed that there were improve feed intake which translate to better body weight gain and this could be attributed to the improvement

obtained with regards to feed consumption and body weight gains are in agreement with what researchers mentioned previously.

Conclusion

Inclusion, the inclusion of capsaicin in red hot pepper into broilers diet at (1.50%) significantly improved the feed intake and increased the weight of broilers within a reasonable period.

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Table 1. Proximate analysis and capsaicin concentration of red hot pepper

Parameter	quantity (%)
Ash	8.5
Moisture Content	9.0
Fat	15.2
Crude Protein	16.0
Fiber	24.0
Nitrogen Free Extract	27.3
Dry matter	91.0
Quantity of capsaicin	29.20

DM = 100 – MC

% NFE = (EE + CP + Ash + CF)

Table2.Growth performance of Marshal broiler chickens fed diets containing varying levels of red hot pepper

	Treatment					
Parameter/phaseT1	T2	T3	T4	SEM	LS	
Starter						

Initial body weight (g/bird)			46.30	46.33	46.33	46.30	0.32 NS
Weeklyfeed intake (g/bird)	365.19^{c}	395.82^{b}	426.35^{a}	430.70^{a}		8.38	*
Weekly bodyweight(g/bird)	294.13^{b}	352.93^{a}	353.83^{a}	331.58^{ab}		10.03	*
Weekly body weight gain(g/bird)	125.25	142.38	143.66	140.93		3.24	NS
Feed conversion ratio	2.92	2.79	2.98	3.06		0.62	NS
Quantity of capsaicin consumed (g/bird)	0.00^{c}	115.58^{b}	124.49^{a}	125.76^{a}		15.28	*
Finisher							
Weekly feed intake (g/bird)	595.38^{b}	734.17	740.33	748.67		21.19	*
Weekly bodyweight (g/bird)	1136.60^{b}	1437.10^{a}	1343.2^{ab}	1305.0^{ab}		45.83	*
Weekly body weight gain (g/bird)	191.06^{b}	258.76^{a}	242.23^{ab}	231.75^{ab}		10.94	*
Feed conversion ratio	3.13	2.85	3.08	3.34		0.12	NS
Quantity of capsaicinconsumed (g/bird)	0.00^{b}	214.00^{a}	216.18^{a}	218.61^{a}		221.59	*

T1= Control (without red hot pepper) ; **T2=**1.00% red hot pepper ; **T3=** 1.25% red hot pepper; **T4=** 1.50% red hot pepper ; **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.