EFFECT OF HIGH FIBRE DIETS WITH OR WITHOUT ENZYME ON SENSORY EVALUATION AND MEAT CHARACTERISTICS OF BROILERS CHICKEN

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Abstract
This experiment was conducted to evaluate the effect of feeding high fibre diet to broilers chicken on sensory evaluation, primal cuts and meat characteristics. A total of two hundred and forty, one-day old Arbor Acres broiler chicks of mixed sex was obtained from a commercial hatchery were used for the trial. An average (33±0.12g body weight) were weighted individually and randomly divided into three (3) Treatments with ten replicate per treatment and eight birds\er replicate using a completely randomized design. The diet contained T1= 8.70% fibre; T2= 13.10% with enzyme and T3= 13.10% fibre without enzyme. The experiment lasted for eight week. Parameters measured were primal cuts, sensory evaluation, cooking loss and yield using a standard procedure. Data were analysed using descriptive statistic and ANOVA at $\alpha_{0.05.}$
There were no significant differences (P>0.05) observed in the primal cuts and sensory evaluation. The cooking loss was significantly higher in Treatment 1(control with 8.7% fibre) 33.36% with least cooking loss in Treatment 3 containing 13.10% (21.54%). Treatment 3 had the highest cooking yield (78.46%) compared to other treatment. The study showed that feeding high fibre diet to broilers chicken at 13.10% enhances better cooking yield and lower cooking loss.

Keywords: High fibre diet, primal cuts, cooking loss, cooking yield, sensory evaluation

Introduction

Meat quality is greatly affected by the diet fed to the farm animal (Oshibanjo, 2010). Diet is an important aspect of animal production, and different bird species or lines have different nutrient requirements depending on age, genetic background and environment as well as the health status of the birds. Thus, nutritionists are faced with a challenge of formulating diets with the available feed ingredients, but also having to mitigate the resulting diet effects to achieve optimum bird production (Walugembe, 2013).
Use of feed ingredients high in dietary fiber in poultry nutrition has generally been discouraged due to the negative effects exerted on nutrient utilization and performance such as decrease in body weight gain and feed conversion (Walugembe, 2013). It is important to note that fibre in monogastric diets is mainly utilized in the hind gut (i.e. ceca, rectum and the colon). Feeding animals diets high in dietary fiber, particularly soluble fiber alters the rate of fecal passage, microbiota, metabolites, and efficacy of digestion (Bach Knudsen, 2001). This experiment was carried out to evaluate the effect of feeding high fibre diet to broilers chicken on sensory evaluation, primal cuts and meat characteristics.

MATERIALS AND METHODS

Experimental site:
The experiment was conducted at Poultry unit Division of National Veterinary Research Institute, Vom Plateau State, Nigeria.

Experimental animal and management:
A total of two hundred and forty, one-day old Arbor Acres roiler chicks obtained from a commercial hatchery were used for the trial. An average (33±0.12g body weight) were weighted individually and randomly divided into three (3) Treatment with ten replicate per treatment and eight birds per replicate. The brooding temperature was kept at an average of 26.5^{0}C from the first to second week of age. Thereafter, the temperature was lowered to 22^{0}C for the rest of experimental period. Wood shaving was used as litter material. From day-old, anti-stress and antibiotic were given to the birds for three days. From week two to three, first and second Infectious Bursal Disease Vaccine (IBDV) was administered. Then, at week four and five Anticocidial drug and Newcastle Disease Vaccine Lasota were given to the birds respectively. The experiment was conducted for the period of eight weeks. The primal cuts of the broiler fed high fibre diet was measured and recorded.
Cooking loss was determined according to the procedure described by Mahendraker *et. al.* (1988).

$$\text{Cooking yield} = \frac{\text{Weight of meat after cooking}}{\text{Weight of meat before cooking}} \times 100$$

Sensory evaluation
Sensory parameters were evaluated using nine-point hedonic scale. A total of twenty trained panelists between the ages of 20 and 40 years were used to evaluate two replicate of the prepared sausage for colour (1-4 dark, 5- intermediate, 6-9 light), tenderness (1-4 tough, 5- intermediate, 6-9 tender), juiciness (1-4 dry, 5- intermediate, 6-9 juicy), and overall acceptability, OA (1-4 low, 5- intermediate, 6-9 high) Mahendrakar (1988).

Experiment diet:
Three experiment diet was formulated with high fibre content as shown in Table 1.

Table 1: Feed composition

Ingredients	T1	T2	T3
Lysine	0.35	0.35	0.35
Methionine	0.20	0.20	0.20
Premix	0.45	0.45	0.48
Salt	0.37	0.37	0.37
Enzyme	0.03	0.03	-
Toxin Blinder	0.02	0.02	0.02
GNC	27.90	27.90	27.90
Maize Bran	25.00	60.00	60.00
Rice Bran	7.50	7.50	7.50
Bone Meal	2.40	2.40	2.40
Lime Stone	0.60	0.60	0.60
Oyatozyme	0.20	0.20	0.20
Maize	35.00	-	-
	100.016	100.016	100.016
Total Percentage	***100***	***100***	***100***

T1= Control (8.7% Fibre); T2= 13.10% Fibre with enzyme T3= 13.10% Fibre without enzyme

Experimental design: Completely randomized design was used.
Statistical Analysis: Data obtained were subjected to analysis of variance using SAS (2010). The means were separated using Duncan's Multiple Range Test of the same procedure.

Results and discussion

Table 2 shows the primal cuts of broilers chicken fed high fibre diet. Comparing the thigh, drumsticks, back, breast meat and wings across the treatment shows no significant difference. Besides, the colour, aroma, flavor, juiciness, tenderness, texture and overall acceptability examined under sensory evaluation shows no difference among the treatment as shown in Table 3. Similar result was obtained by Al-Hajo *et al.* (2013) who compared chicken groups fed high fibre did not differ in terms of juiciness, flavour, overall acceptance, and general acceptance. The cooking loss and yield of meat from broilers chicken fed high fibre diet is represented in Table 4. The cooking loss of breast meat from broilers chicken fed control (8.70% fibre) had the highest cooking loss with least cooking loss in Treatment 3. While Treatment 3 had the highest cooking yield with lowest cooking yield in Treatment 1. Meanwhile both the cooking loss and yield for drumstick and thigh shows no significant differences. The result obtained could be due to ability of the high fibre to hold water within the muscle of the broilers chicken.

Table 2: Primal cuts of broilers chicken fed high fibre diet.

Parameters (g)	T1	T2	T3	SEM
Thigh	266.67	286.67	263.67	14.19
Drumstick	209.33	222.67	231.33	8.26
Back	277.00	312.33	335.67	14.69
Breast	511.33	569.00	554.00	22.63
Wings	161.67	173.67	173.33	5.49

[a,b,c] Means across rows with different superscripts differ significantly at P<0.05
T1= Control (8.7% Fibre); T2= 13.10% Fibre with enzyme T3= 13.10% Fibre without enzyme.

Table 3: Sensory evaluation of meat from broilers chicken fed high fibre diet

Parameters	T1	T2	T3	SEM
Colour	5.10	4.80	4.80	0.29
Aroma	3.60	2.10	3.50	0.38
Flavour	3.60	3.30	3.50	0.29
Juiciness	5.30	4.00	4.00	0.36
Tenderness	5.00	5.10	5.00	0.29
Texture	4.30	4.40	4.50	0.29
Overall acceptability	4.30	3.50	3.10	0.34

[a,b,c] Means across rows with different superscripts differ significantly at P<0.05
T1= Control (8.7% Fibre); T2= 13.10% Fibre with enzyme T3= 13.10% Fibre without enzyme.

Table 4: Cooking loss and yield of meat from broilers chicken fed high fibre diet

Parameters	Primal cuts	T1	T2	T3	SEM
Cooking loss	Breast	33.36^{a}	24.74^{b}	21.54^{b}	2.16
	Drumstick	28.17	21.15	19.62	2.93
	Thigh	29.29	24.48	22.42	2.11
Cooking yield	Breast	66.64^{b}	75.26^{a}	78.46^{a}	2.16
	Drumstick	71.83	78.85	80.38	2.93
	Thigh	70.71	75.52	77.58	2.11

[a,b,c] Means across rows with different superscripts differ significantly at P<0.05
T1= Control (8.7% Fibre); T2= 13.10% Fibre with enzyme T3= 13.10% Fibre without enzyme.

Conclusion

The study showed that feeding high fibre diet to broilers chicken at 13.10% without the use of enzyme enhances better cooking yield and lower cooking loss.

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