

Evaluation of meat quality and organoleptic properties of broiler chicken fed soybean milk residue-based diets

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Abstract

The meat quality and organoleptic properties of broiler chickens were evaluated using 150 day-old Sayed broiler chicks with an average weight of 40g each, which were fed graded levels of soybean milk residue. Experimental chicks were randomly assigned to 5 dietary treatments (T1, T2, T3, T4, & T5) with 30 chicks per treatment in a Completely Randomised Design (CRD). Diets including graded levels of soybean milk residue at 19% (T1), 18.5% (T2), 18% (T3) and 17.5% (T4) respectively were formulated for the treatment, and a control diet (T5) that did not contain soybean milk residue but sourced from a reputable commercial feed (Chikun broiler feeds). After feeding the birds with the diets for 8 weeks, the physiochemical composition and sensory properties of the broiler meat were measured. Data obtained from the study were subjected to Analysis of variance (ANOVA) appropriate using the Minitab16 statistical software. There was no significant difference ($p>0.05$) in all the parameters measured except for aroma and taste. It was concluded that soybean milk residue ensured good meat constituent of the broiler chickens, and recommended that 17.5-19 % soybean milk residue in broiler diets contributed to the post mortem meat quality and sensory properties of the broiler chicken.

Keywords: Soybean milk residue, broiler chickens, meat quality, sensory properties

Description of Problem

Alternative feedstuffs are now mostly used to curb the expensive conventional ones which usually escalate feed cost in broiler production (1). These feedstuffs are not only cheaper but are readily available and can be used to achieve the growth performance (2). Soybean milk residue, which is gotten after soy milk has been produced, is a good alternative feedstuff, rich in vital food nutrients and has potential for value-added processing and utilization such that it can be utilized as animal feed ingredients (3). Therefore, this study is aimed at assessing the meat quality and sensory properties of broiler chickens fed soybean milk residue-based diets and comparing the results with those in the control

Material and Methods

The study was carried out at the Animal Teaching and Research Farm of the Department of Animal Health and Production Technology, Federal Polytechnic, Bali, Taraba State. Bali is Located between latitude 7 °12 to 12 °00E of the equator,

and longitude 10°00E to 12°00E of the Greenwich Meridian (4). A total of 150 day-old Sayed broiler chicks with an average weight of 40g each were randomly assigned to 5 treatments (T1, T2, T3, T4, & T5) with 30 chicks per treatment in a Completely Randomised Design (CRD). Diets including graded levels of soybean milk residue at 19% (T1), 18.5% (T2), 18% (T3) and 17.5% (T4) respectively were formulated for the treatment, and a control diet (T5) that did not contain soybean milk residue but sourced from a reputable commercial feed (Chikun broiler feeds) as seen in Table 1.

After feeding the birds with the diets for 8 weeks, the physiochemical composition and sensory properties of the broiler meat were measured. Half a kilogram of broiler meat cut from 5 birds selected at random from each treatment was used to analyse for meat pH, extract released volume (ERV) and water holding capacity (WHC) as outlined by (5). Also, organoleptic test was carried out to evaluate the post mortem colour,

aroma, taste (flavour), and overall acceptability by a test panel selected at random irrespective of gender, age, and religion saddled with the responsibility to eat by chewing and swallowing completely the portion assigned according to the method outlined by (6) following a prepared questionnaire. Individual's observation and

judgment recorded the hedonic 9-point scale. Data collected in this experiment were subjected to Analysis of variance (ANOVA) appropriate using the Minitab16 (7) statistical software. Probability level of 5% ($p \leq 0.05$ and confidence level of 95%) was observed for determining significance among treatments

Table 1: Treatment Diets For The Experiment Per 100% (100kg) Formulation

Ingredient (kg)	T1	T2	T3	T4
Yellow Maize	35.00	35.00	35.00	35.00
Maize Bran	30.00	30.00	30.00	30.00
SBMR	19.00	18.05	18.00	17.50
Fish Meal	4.00	4.00	4.00	4.00
Bone Meal	2.00	2.00	2.00	2.00
Soybean meal	7.00	7.50	8.00	8.50
Table Salt	1.00	1.00	1.00	1.00
Eaas	1.00	1.00	1.00	1.00
FLLM	1.00	1.00	1.00	1.00
Total	100.00	100.00	100.00	100.00
Calculated analysis (%)				
Crude protein	12.08	12.20	12.29	12.40
Crude fibre	7.17	7.22	7.27	7.32
Ether extract	8.10	8.09	8.06	8.02
Ash	1.60	1.70	1.72	1.74
Nitrogen Free Extract	71.05	70.79	70.66	70.52
Metabolizable energy (Kcal/kg)	2651.50	2651.00	2650.50	2650.00

FLLM= *Ficus lyrata* meal, Eaas =Essential Amino Acids, SBMR= Soyabean Milk residue

Result and Discussion

Table 2 showed that soybean milk residue imposed significant difference ($p < 0.05$) on only aroma and taste of the meat. Panelist assessment was based on a 9-point hedonic scale with the score having a maximum score of 9, and the worst condition receiving the lowest score of 1 as described by (6). The pH value of broiler meat was within the 5.8 normal pH according to (8). Extract release volume (ERV) were between 34.32 - 36.32 ml which correlated with pH obtained and indicates that the meat can store

well. Diaz (8) outlined >25 ml for good quality, >20 ml for incipient spoilage and <20 ml for spoiled meat. Water holding capacity (68.88 - 73.77 %) was comparable to the 61.77 - 63.36 % reported by (9) and 72.39 % reported by (10). This showed that the meat had good visual acceptability as well as sensory traits on consumption especially for tenderness. Chicken is pinkish to bright red in appearance, light red in appearance and the aroma depends on the breed (8).

Table 2: Meat Quality of Broiler Chickens fed diets containing Soybean Milk Residue

Parameters	Treatments					SEM
	T1	T2	T3	T4	T5	
Post mortem meat pH	5.76	5.78	5.71	5.74	5.72	0.08
Extract release volume (ml)	34.32	36.32	34.79	35.27	36.15	2.01
Water holding capacity (%)	62.88	63.77	64.10	63.20	63.88	1.81
Post mortem meat colour	27.46	25.56	23.40	23.26	23.86	1.21

Aroma	8.65 ^a	8.45 ^{ab}	8.20 ^b	8.65 ^a	7.25 ^c	0.44
Taste	7.55 ^a	7.75 ^a	7.55 ^a	7.95 ^a	7.00 ^b	0.46
Acceptance	8.40	7.90	8.05	8.00	7.95	0.42

^{abc}Means with different superscript within the same row differ significantly (P<0.05)

Conclusion and Application

It was concluded that soybean milk residue ensured good meat constituent of the broiler chickens. Also, it was recommended that 19 % soybean milk residue in broiler diets contributed to the post mortem meat quality and sensory properties of the broiler chicken.

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