MEAT QUALITY AND CONSUMER PREFERENCE OF BROILERS CHICKENS FED SELF–FORMULATED AND COMMERCIAL-BASED FEEDS

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ABSTRACT

The aim of this study is to evaluate the meat quality and consumer preference of broilers chickens fed self–formulated and commercial-based feeds. A total of 120 Agritec broiler chicks were divided into four (4) groups. Each group were fed with a different diet for a period of 42 days. Each treatment consisted of three (3) replicates with ten (10) birds each in a Completely Randomized Design. Feeds were formulated at the experimental site to meet the nutritional requirements as recommended by NRC. The three (3) commercial feeds used. A total of 16 (4 from each group) apparently healthy birds were manually slaughtered. After slaughtering, muscle were washed and transported in a cooler containing ice pack to the laboratory. pH, Water holding capacity, cooking loss, oxidative rancidity and Sensory Characteristics using a standard procedure were measured. Data were analyzed using descriptive statistic and ANOVA at α0.05. pH value of the self-formulated feed was higher (6.80) as compared to T1(6.77)>T2(6.60)>T3 (6.63). The WHC was higher (46.67%) in T1 and the least observed in T3 (33.33%). The oxidative rancidity was observed to be significantly ($P<0.05$, 0.69) higher in T3 with the least in self-formulated feed. The cooking loss in the drum stick and thigh muscles were significantly ($P<0.05$) higher in the self-formulated and T2 respectively. However, no significant differences ($P > 0.05$) were observed in acceptance of the sensory characteristics of the meat between treatments. In conclusion, self-formulated feed had the best physicochemical and overall acceptability.

Key words: meat quality, consumer preference, broilers chickens, fed self–formulated, commercial-based feeds and oxidative rancidity

INTRODUCTION

In the recent past, the poultry industry has undergone a lot of transformation and development in order to improve poultry meat quality and reach a higher acceptance by the consumers. Nutrition serves as one of the most important factors in broiler production and can have a crucial effect on the quality broiler meat. There are several factors affecting the quality of poultry meat, such as age, breed, sex, genotype of the birds as well as diet stand out among biological factors (Glamoclija *et al.*, 2015, . Zhai, *et al.* 2016; Lewis *et al.* , 1997; Bokker andKoene, 2003). Diet composition and feed consumption can affect meat quality (Mukhtar and Rano, 2019). The poultry industry has remained competitive due to its capacity to adapt to the changing needs and preferences of consumers. However, throughout the transformation of the carcass into commercial products, processing companies have faced several problems in terms of meat quality. These problems are related to characteristics of tenderness, colour, water holding capacity (WHC) and cohesion capacity, which have been reported in chicken and turkey meat

Broiler production at mass level has already been achieved, however emphasis is now laid on increasing meat quality by altering the said characteristics of broiler meat.

The present study aimed to determine carcass meat quality and consumer preference of broiler chickens and to exploit the potential of using self-formulation of broiler feed in comparison to the most common available commercial feeds in Jos South Local Government Area of Plateau State).

MATERIALS AND METHODS

The experiment was conducted in the poultry unit of the large animal experiment farm, Federal College of Animal Health and Production Technology, Vom, Jos South Local Government Area, Plateau State. At both starter and finisher phases, total of 120 Agritec broiler chicks were divided into four (4) groups. Each group were fed with a different diet for a period of 42 days. Each treatment consisted of three (3) replicates with ten (10) birds each in a Completely Randomized Design. Ingredients for On-farm feed formulation of experimental diets were purchased from a commercial Poultry outlet in Bukuru, Jos South Local Government Area, Plateau State. Feeds were formulated at the experimental site to meet the nutritional requirements as recommended by NRC (1994). The three (3) commercial feeds used in the experiment are purchased in Plateau state and are of reputable standard quality. The birds were housed in a deep litter pens. Feed and water were provided *ad libitum.* Routine vaccination against Newcastle and Gumboro diseases were administered at appropriate time and the birds were treated against *Coccidiosis* throughout the duration of the experiment. All routine management practices were strictly adhered to. The starter phase lasted for 0-3 weeks while the finisher phase lasted for 4-6 weeks.

Processing: A total of 16 (4 from each group) apparently healthy birds were manually slaughtered following the Halal method.

Meat quality: Approximately 4 hours after slaughter muscle were rinsed and washed with clean water to remove blood and cut into small pieces.

pH was measured using a pH meter in meat homogenate, prepared by blending 10 g of meat with 50 mL distilled water. The laboratory pH meter was adjusted at room temperature (adjusted with buffer pH 7.0).

Water holding capacity (WHC) was measured by modification of the Grau and Hamm (1953).

Cooking loss: The meat sample was boiled at 90 ^{o}C for 20 min. Cooking loss was determined by the following calculation:

$$CL\ (\%) = \frac{\text{Initial weight of fresh meat - weight of meat after cooking}}{\text{Initial weight of fresh meat}} \times 100$$

Peroxide (oxidative Rancidity) value determination: The peroxide value was determined according to Sallam *et al.,* 2004.

Sensory Characteristics: The parameters evaluated included color, aroma, flavor, juiciness, tenderness, and overall acceptability according

Statistical analysis: Data were analyzed using the SPSS version 25. Results were presented as mean±standard deviation and significance level was set at 5%.

RESULT

Table 1 shows the pH, water holding capacity (WHC), oxidative rancidity and cooking loss (breast drumstick and thigh muscles) values of the self-formulated and commercial feeds. In this study, the pH value of the self-formulated feed was higher (6.80) as compared to T1(6.77)>T2(6.60)>T3 (6.63). the pH of self-formulated and T1 significantly ($P<0.05$) higher than T2 and T3. The WHC was higher (46.67%) in T1 and the least observed in T3 (33.33%) and no significant ($P>0.05$) difference in all the groups. The oxidative rancidity was observed to be significantly ($P<0.05$, 0.69) higher in T3 with the

least in self-formulated feed. The cooking loss in the drum stick and thigh muscles were significantly (P<0.05) higher in the self-formulated and T2 respectively. However, there was no significant difference in the breast cooking loss.

The acceptance of colour appearance, flavour and total acceptance of chicken meat had a score between 3 (indifferent) and 4 (I like it). However, no significant differences (P > 0.05) were observed in acceptance of the sensory characteristics of the meat between treatments. However, the sensory panel had no prior training because the aim was to obtain a general acceptance evaluation and, therefore, specific sensorial characteristics were not evaluated.

Table1: Effect of feed brands on meat quality of broiler chickens

Parameters	SELF FEED	T1	T2	T3	SEM
pH	6.80^{a}	6.77^{a}	6.60^{b}	6.63^{b}	0.03
Water holding capacity (%)	36.67	46.67	41.11	33.33	2.87
Oxidative rancidity (mg/g)	0.30^{d}	0.41^{c}	0.52^{b}	0.69^{a}	0.04
Breast cooking loss (%)	13.53	14.23	16.83	15.19	0.60
Drumstick cooking loss (%)	12.27^{a}	7.11^{b}	7.52^{ab}	11.13^{ab}	0.90
Thigh cooking loss (%)	14.56^{b}	9.23^{c}	24.44^{a}	16.69^{b}	1.90

$^{a, b, c}$ *means with different superscripts on the same row differ significantly (P<0.05)*
T1= Brand A; T2= Brand B; T3= Brand C

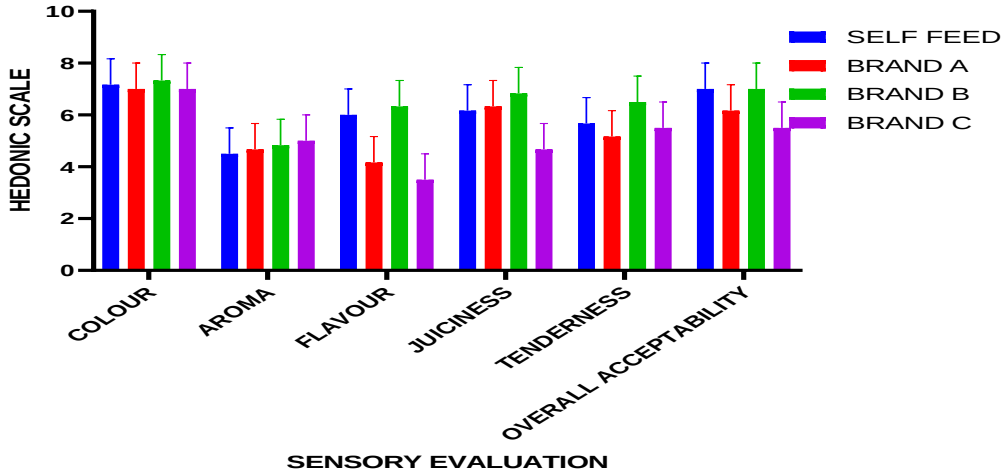

Figure 1: Consumers preference of broiler chicken meat as affected by feed brands

DISCUSSION

There are changes in pH during the period of meat aging (Velasco et al., 2011). The pH of muscle is near neutrality in the first 3 to 4 hours, after slaughter it decreases with variability between 5.79-6.40 at 24 hours post mortem (Qiao *et al.*, 2002; Temprado, 2005; Cori *et al.*, 2014 and Velasco *et al.*, 2018). This could be due to the fact that the pre-slaughtering management, level of glycogen and level of stress to which the chickens were subjected were not similar for all treatments.
The concept of meat quality is difficult to be defined due to the subjective nature of the features such as texture, juiciness, wateriness, firmness, tenderness, odor and flavor are the most important and perceptible meat features that influence the initial and final quality judgment by consumers before and after purchasing a meat product (Jiang *et al*., 2014; Walley, *et al.*, 2015; Beriain et al., 2000; Cross *et al*. 1986). It can be stated that if poultry meat fully accomplishes the consumer expectations then poultry meat is of good quality than other meats. Appearance, flavor, aroma and texture of the meat can lead the decision of a consumer to purchase meat (Jayasena et al., 2013). In this study, self-formulated feed had the highest overall acceptability.

CONCLUSION

In conclusion, self-formulated feed had the best physicochemical most preferred overall acceptability and least oxidative rancidity and beast meat cooking loss.

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