

CARCASS CHARACTERISTICS AND SENSORY ASSESSMENT OF FUNNAB ALPHA BROILER CHICKENS FED DIFFERENT PROTEIN LEVELS

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ABSTRACT

This experiment was conducted to determine the carcass characteristics and sensory attributes of FUNAAB Alpha broiler chickens fed diets containing different protein levels. A total of one hundred and twenty (120) day-old FUNAAB Alpha chicks were used for the study. The chicks were randomly allocated to four varying dietary protein levels of 14, 17, 20 and 23 % CP and were tagged CP₁₄, CP₁₇, CP₂₀ and CP₂₃, respectively. The birds were allocated to the four treatments using a Completely Randomized Design (CRD). Each treatment group was replicated thrice with ten birds per replicate. The birds were housed in deep litter system where they received uniform care and management. The experiment lasted for thirteen weeks. Light was provided 24 hours daily, while feed and clean drinking water were given *ad libitum*. At the thirteenth week, data on carcass and sensory attributes were taken. Results showed that dietary treatment did not influence ($P>0.05$) all carcass characteristics measured except wing weight. Sensory assessment results showed that there were no significant differences ($P>0.05$) in all the parameters measured except in Aroma. Meat from birds fed CP₂₃ diet had better ($P<0.05$) aroma than those fed other diets. It is, thus recommended that a CP level of 23 % can be used in diet of FUNAAB Alpha chickens for improved wing weight and better aroma.

Keywords

FUNAB Alpha, dietary protein, carcass, sensory

INTRODUCTION

Local chickens play an important role as household food supply in rural areas of developing countries (Zaman *et al.*, 2004). It is also a means of providing additional income to the generally resource-poor small holder farmers (Gueye, 2004), thereby helping to alleviate poverty. Despite the fact that more than 90 % of the Nigeria poultry production system consists of local chickens, their contribution to human nutrition, gross domestic products and export earnings are disproportionately low. These problems are mainly due to nutrition and poor growth rate (King'ori *et al.*, 2003). [Jafarnejad and Sadegh \(2011\)](#) reported that dietary protein had effect on the body weight gain on broiler chickens.

Chemjor (1998) reported that a dietary protein level of 13 % was adequate for indigenous chickens aged between 14 and 21 weeks. King'ori *et al.* (2003) observed that indigenous chickens require a protein level of 16 % to optimize feed intake and growth between 14 and 21 weeks of age. Furthermore, Ndegwa *et al.* (2001) reported that indigenous chickens fed diets containing 17 to 23 % CP had similar growth rates and feed intakes, suggesting that a 17 % CP diet was sufficient for these chickens. Moreso, Makinde and Egbekun (2016) reported that the optimal dietary crude protein for Fulani Ecotype chickens is 22 % CP for 0-6 weeks of age and 20 % CP for 6-12 weeks of growth. Information on the protein requirements of indigenous chickens is inconsistent. Furthermore, FUNAAB Alpha is a new breed of Indigenous chicken in Nigeria with high potentials. This breed has almost the same potential with imported

Sasso and Kuroiler chickens but is superior to Fulani Ecotype and the Shika brown. The protein requirements for this chicken has not been established especially its effect on the carcass and sensory attributes, therefore, this study was aimed at evaluating the carcass characteristics and sensory properties of FUNAAB Alpha broiler chickens fed different dietary protein levels.

MATERIALS AND METHODS

Location of the Experiment site

The study was carried out in the poultry section of the Teaching and Research Farm of the Department of Animal Production, Federal University of Technology, Minna, Niger State. Minna is located between latitude 4° 30 and 9° 37 North and longitude 6°33 and 06°45 East with an altitude of 1475 m above sea level (Niger State Agricultural Development Project; NSADP, 2009). The study was conducted between May and September, 2018.

The experimental ingredients used for the research were obtained from Minna Ultra-Modern Market, Minna Niger State. The FUNAAB Alpha chicks were obtained from Federal University of Agriculture, Abeokuta, Ogun State, Nigeria. A total of one hundred and twenty (120) day-old of FUNAAB Alpha chicks were used for the study. The chicks were graded and randomly allocated to four varying dietary protein levels of 14, 17, 20 and 23 % CP and were tagged CP₁₄, CP₁₇, CP₂₀ and CP₂₃, respectively. The birds were allocated to the four treatments using a Completely Randomized Design (CRD). Each treatment group was replicated thrice with ten birds per replicate. The birds were housed in deep litter system where they received uniform care and management. The experiment lasted for thirteen weeks. Light was provided 24 hours daily, while feed and clean cool drinking water were given *ad libitum*. The diet was isocaloric containing 3100kcal of energy.

Carcass Characteristics and Sensory Evaluation of Birds

At the end thirteen week, two birds per replicate were randomly selected from each of the treatment pen and used for the carcass and organ measurements. The birds were starved overnight to empty the gut before weighing and slaughtering the next morning. Carcasses were defeathered and the inner organs were removed. The birds were dressed and the dressed weight and dressing percentage (carcass yield) were computed. Cut-up parts were all weighed and expressed as percentage of live weight. The visceral organs for each bird which include full gizzard, liver, full intestine, heart, spleen, abdominal fats and caeca were also weighed and expressed as percentage of live weight.

The sensorial evaluation was performed according to the methodology of Dutcosky (2007). The cut sample of the breast was cooked for twenty minutes in 500 mls of water with a pinch of common salt in an aluminium pot without any spices added. The meats were served to 30 semi-trained panellists, comprising of staff and students which were randomly selected from the School of Agriculture and Agricultural Technology, Federal University of Technology, Minna, Nigeria. A 9- point hedonic rating scale from 1 to 9 (1: disliked extremely; 2: dislike very much; 3: dislike moderately; 4: dislike slightly; 5: neither like nor dislike; 6: like slightly; 7: like moderately; 8: like very much; 9: like extremely) was used to evaluate the aroma, flavour, colour, texture and over all acceptability of the meat from the experimental birds. All data collected on carcass characteristics and sensory attributes were analysed by one-way analysis of

variance (ANOVA) in a Completely Randomized Design (SAS, 2015), where mean differences occurred, they were separated using Duncan's Multiple Range Test.

RESULTS AND DISCUSSION

Carcass characteristics of FUNAAB Alpha Chickens fed Different Levels of Crude Protein

Table 1 shows the carcass characteristics of FUNAAB Alpha chickens fed different levels of protein diets. The results showed that there were no significant differences ($P>0.05$) in all the parameters measured except the wings weight which was influenced ($P<0.05$). Wing weight values of chickens fed diets having 17 and 23 % crude protein were higher ($P<0.05$) than those fed 14 % CP diet. The reason for this is not well known, it might be that 14 % CP is inadequate to improve wing weight. Leeson and Summers, (2000) did not observe any significant difference in broiler chickens fed different dietary protein and that dietary protein levels have no effect on the quality of protein deposited in the carcass. Varying dietary protein levels did not affect carcass yield of the FUNAAB Alpha chickens and this result is in agreement with Leeson *et al.* (1996) and Smith and Pesti (1998), who found that levels of protein in diet did not affect carcass yield and protein deposition. Similarly, Renden *et al.* (1992) found no significant effect of protein levels on carcass quality of broiler chickens.

Table 1: Carcass characteristics of FUNAAB Alpha Chickens fed Different Levels of Crude Protein

PARAMETERS	CP ₁₄	CP ₁₇	CP ₂₀	CP ₂₃	SEM
Live Weight	2133.33	2366.67	2366.67	2300.00	80.21
Carcass Weight	2000.00	2266.67	2200.00	2133.33	70.17
Dress Weight	1900.00	2166.67	2100.00	2033.33	70.17
Breast	15.98	15.13	15.05	15.43	0.48
Drum Stick	8.18	8.89	8.54	8.75	0.34
Thigh	9.75	12.41	13.08	12.46	0.61
Wings	7.95 ^b	10.84 ^a	10.24 ^{ab}	10.67 ^a	0.47
Gizzard	2.98	2.41	2.42	2.55	0.18
Liver	1.33	1.93	1.92	1.83	0.11
Heart	0.30	0.25	0.24	0.23	0.23

^{a,b}; Means in the row not showing a common superscript are significantly different ($P<0.05$)
CP= Crude protein levels; SEM= Standard error of mean

Sensory Evaluation of FUNAAB Alpha chickens fed Different Levels of Crude Protein

The results of sensory evaluation of FUNNAB Alpha chickens meat fed different levels of crude protein are presented in Table 2. The results showed that there were no significant

differences ($P>0.05$) in all the parameters measured except in Aroma. The aroma results showed that as the level of dietary protein increases the aroma improved. The meat from chickens fed CP23 diet had the best aroma and it was significantly higher ($P<0.05$) than the other treatments. The meat from birds on dietary CP20 was better ($P<0.05$) than those on dietary CP17 and CP14 which had similar values. The improved aroma at high CP level might be as a result of fat deposited in chickens on high CP diets. Rabie *et al.* (2017) found that among all food constituents, lipids generally have the greatest influence on production of aroma flavour components, as they do not reduce the vapour pressure of most flavoured compounds. Kinsella (1990) showed that aroma compounds are more lipophilic than hydrophilic therefore fats act as a solvents for aroma compounds reducing their volatility.

Table @=2: Sensory Evaluation of FUNAAB Alpha chickens fed Different Levels of Crude Protein

Parameter	CP ₁₄	CP ₁₇	CP ₂₀	CP ₂₃	SEM
Colour	6.46	6.85	7.15	6.58	0.41
Juiciness	6.62	6.92	7.08	6.73	0.13
Appearance	6.88	7.04	7.38	7.00	0.26
Flavor	6.19	6.69	7.08	6.92	0.15
Aroma	6.42 ^c	6.58 ^c	6.77 ^b	7.23 ^a	0.13
Tenderness	7.00	7.04	7.58	7.11	0.13
Overall Acceptability	7.27	7.27	7.77	7.13	0.13

^{a,b}; Means in the row not showing a common superscript are significantly different ($P<0.05$)
 CP= Crude protein, SEM= Standard error of mean

CONCLUSION AND RECOMMENDATION

The results of the present study showed that dietary crude protein affects only the wing weight and the aroma of FUNAAB Alpha chickens. Birds on dietary crude protein level of 23 % did better in both parameters. It is, thus recommended that a CP level of 23 % can be used in diet of FUNAAB Alpha chickens for improved wing weight and better aroma.

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MICROBIAL QUALITY OF *TSIRE* OFFERED FOR SALE AT HADEJIA LOCAL GOVERNMENT AREA, JIGAWA STATE

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Abstract

Microbial quality of raw meat and *tsire* sold at retail outlets from Yayari, Yankoli and Matsaro of Hadejia metropolis, Jigawa State were evaluated. Three samples from each outlet were collected fortnightly from 3rd to 17 April, 2018 into sterile plastic bags, stored at 4 °C in ice chest filled with ice and transported immediately to the laboratory for Total Viable Count (TVC), Total Coliform Count (TCC), Total Staphylococcus Count (TCS) and Total Fungal Count (TFC) analyses using Nutrient Agar, Mac Conkey Agar, Mannitol Salt Agar and Potato Dextrose Agar, respectively and incubated at 37 °C for 24 hours except for the detection of fungi, which was incubated at 25 °C for 5 days. *Tsire* samples collected from Matsaro have the highest TVC (6.0×10^4) while that from Yankoli has the highest TCS (4.0×10^2). The presence of bacteria on raw meat and *tsire* sold at the study area is an indication of low standard of animal and meat handling practices from pre-slaughter to post-slaughter, sales of meat, abattoir facilities and equipment.

Key words: Microbial, *Tsire*, Sale, Hadejia and Jigawa

Introduction

Tsire is a roasted or smoked beef or other boneless animal meat. It is rich in protein, mineral (zinc, selenium and phosphorus) and is also a good source of niacin, vitamin B6 (pyridoxine) and iron (Koffi-Nevry *et al.*, 2011). It is one of the most street-vended meat products in Nigeria and sub-Saharan Africa (Abdullahi *et al.*, 2006). The preparation processes of *tsire* involve de-fatting and slicing the meat on a slab or table, after which it is staked into sticks, spiced and roasted for about twenty (20) minutes, thereafter, the products is spiced again and briefly reheated for about two (2) minutes. It's then displayed for marketing on table tops or trays where it can be street-vended (Edema *et al.*, 2008). *Tsire* preparation process in Nigeria lacks standard or hygienic quality control: therefore there is increase in food safety risks (Odusole and Akinyanju, 2003; Inyang *et al.*, 2005 and Adzitey *et al.*, 2010). Notwithstanding the major role meat plays in our meals, it can also serve as a rich medium of growth for harmful microorganisms. Meat infected with microorganisms is the cause of many food-borne diseases (WHO, 1997). The source of this pathogenic microorganism may be the animals themselves or from outside the surroundings where these animals are kept as well as the way they are processed after slaughtering can also result in contamination with microorganisms (Adeyemo, 2002). Meat infected with microorganisms is normally poor in quality (Mukhopadhyay, 2009). Microbes such as *Staphylococcus* spp., *Aspergillus* spp., *Salmonella* spp., *Enterococcus* spp., *Streptococcus* spp. and *Escherichia coli* have all been found on contaminated meat (James *et al.*, 2005). The study is aimed to examine the microbial quality of *tsire* offered for sale at Hadejia Local Government Area of Jigawa State.

Materials and Methods