



## EVALUATION OF MEAT QUALITY TRAITS OF MALE AND FEMALE GUINEA FOWL

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### Abstract

#### Keywords:

Organoleptic traits,  
proximate composition, meat,  
guinea fowl

The meat quality traits which include the organoleptic traits and proximate composition of male and female guinea fowl were evaluated at the poultry unit of Department of Animal and Environmental Biology, Adekunle Ajasin University, Akungba-Akoko Nigeria. Male and female guinea fowls were raised under the same management condition for twelve weeks and slaughtered. They were properly bled and dressed. Proximate analysis was carried out on the meat samples. Cooked samples were evaluated on a 7-point scale for the organoleptic traits. Data obtained was subjected to analysis of variance (SAS, 2010) Analysis of variance showed that there was no significant difference in the crude protein of male and female guinea fowl. However, male guinea fowl had significantly ( $p < 0.05$ ) higher moisture content, ash content and nitrogen free extract ( $6.98 \pm 0.16\%$ ,  $2.98 \pm 0.09\%$  and  $40.62 \pm 4.70\%$  respectively) compared with female guinea fowl ( $6.51 \pm 0.28\%$ ,  $2.41 \pm 0.28\%$  and  $32.58 \pm 0.80\%$  respectively). Meat from female guinea fowl had significantly ( $p < 0.05$ ) higher fat content ( $24.18 \pm 2.19\%$ ) compared with male guinea fowl ( $20.36 \pm 1.2\%$ ). The effect of sex of guinea fowl was not significant ( $p > 0.05$ ) on the meat colour in this study. Meat from male and female guinea fowl have similar value for colour. However, male guinea fowl meat were ranked better for taste, flavour, and overall acceptability while the meat from female guinea fowl had better ranking for juiciness and tenderness. In conclusion, sexual dimorphism exist in meat quality traits of guinea fowl.

Accepted: 7 June 2019

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### INTRODUCTION

Guinea fowl is gaining popularity as meat birds in many developing countries due to its delicacy and high nutritional value. In addition to high protein, guinea fowl meat is also characterized by low fat content, (Moreki and Seabo, 2012) Guinea fowl also have ability to protect itself against predators and has better resistance to common poultry parasites and diseases (Kerketta and Mishra, 2016). Other advantages of rearing guinea fowl include low production costs, greater capacity to utilize forage and lower requirements of labour and management. Guinea fowl meat also has

the advantage of unique taste. The evaluation and comparison of meat traits of guinea fowl may arouse the interest of potential producers of this avian species (Bernacki *et al.* 2012).

The quality of the poultry meat can be assessed by several attributes primarily the sensory (colour, tenderness, flavour, juiciness), physical (muscle yield, water holding capacity, cooking loss) and proximate analysis (Khawaja *et al.*, 2013). According to Holcman *et al.* (2003), meat quality is influenced by several factors. Sogunle *et al.* (2010) reported that the

strain of broiler had significant effect on the proximate composition though the effect was not significant on the sensory properties of chicken meat. The report of Fakolade (2015) showed that age has significant effect on proximate composition of poultry specie studied (chicken and quail). Moreki *et al.* (2012) found that crude protein, ether extract and nitrogen free extract increases while moisture content of meat decreases with age in guinea fowl.

The effect of sex on the proximate composition and organoleptic traits of poultry species has also been reported by some authors. The study of Iman Rahayu *et al* (2008) showed that the fat content of red jungle fowl meat was significantly affected by sex with the female having higher value than their male counterparts. However Sola-Ojo *et al* (2011) reported that the effect of sex was not significant on crude protein, total ash, crude fat, crude fibre and moisture content of Nigeria Fulani ecotype chicken meat. Holcman *et al* (2003) also

#### Experimental animals and management

Thirty male and female guinea fowl were raised under the same management condition. They were fed with commercial pelleted diet; the diet used contained 17% Crude protein, 7% fat, 10% Crude fibre, 1.0% Calcium, together with available phosphorus of 0.35% and 2550Kcal/kg metabolisable energy. Clean water was also supplied to the birds ad- libitum.

#### Slaughtering, proximate and sensory evaluation procedure

At 12 weeks, they were weighed and slaughtered. They were properly bled and dressed. Meat samples were collected from the carcass of male and female guinea fowl and taken to the Central Research Laboratory, Faculty of Science of the University. Proximate analysis was carried out on the meat samples to determine the crude protein, fat content, moisture content ash content and the nitrogen free extract using AOAC (2005). Samples for sensory evaluations were taken from the thigh muscle and cooked to an internal temperature of 75°C. Adult individuals aged between 25 and 40 years were used to assess the cooked meat samples. Equal bite size from each the sex was coded and served in an odourless plastic plate. Each sample was evaluated independent of the other. The samples were evaluated on a 7-point scale for colour, flavour, taste, juiciness, tenderness, texture and overall acceptability.

#### Statistical analysis

Data obtained from the measurements was analyzed using SAS 2010. The linear model is as specified below:

$$Y_{ijk} = \mu + A_i + e_{ijk}$$

$Y_{ijk}$  = the parameter or interval

reported a non- significant effect of sex on proximate composition of broiler chicken meat. Literature on the effect of sex on the proximate composition and organoleptic traits of guinea fowl meat is scarce. This study was therefore carried out to investigate on the proximate composition and organoleptic traits of male and female guinea fowl meat.

## MATERIALS AND METHOD

### Experimental site

The experiment was carried out at the poultry unit of the Department of Animal and Environmental Biology, Adekunle Ajasin University Akungba-Akoko, Ondo state. Akungba-Akoko is located in Akoko South West Local Government Area of Ondo State, Nigeria. The area lies in the South Western region of Nigeria (7° 28' and 5°43') with ambient temperature of 27°C and relative humidity of 46mm Hg.

$\mu$  = overall mean for the parameter of interest

$A_i$  = Fixed effect of ith sex (j=1-2)

$e_{ijk}$  = random error associated with each record (Normally= Independently and identically distributed with zero mean and variance ( $\delta^2e$ ))

## RESULTS AND DISCUSSION

The means and standard error of means of the proximate composition presented on Table 1 shows that there was significant difference ( $P < 0.05$ ) in the moisture content, ash content, fat content and nitrogen free extract of meat of male and female guinea fowl. Male guinea fowl meat had higher moisture content, ash content and nitrogen free extract ( $6.98 \pm 0.16\%$ ,  $2.98 \pm 0.09\%$  and  $40.62 \pm 4.70\%$  respectively) compared with female guinea fowl meat (with  $6.51 \pm 0.28\%$ ,  $2.41 \pm 0.28\%$  and  $32.58 \pm 0.80\%$  respectively). The crude protein of meat from male ( $33.22 \pm 1.35\%$ ) and female ( $34.32 \pm 0.99\%$ ) guinea fowl meat were not statistically different in this study. Sola-Ojo *et al.* (2011) reported that there was no significant difference in the crude protein of male and female Nigeria Fulani ecotype chicken meat. According to Mbaga *et al* (2014), crude protein and ash content were similar in local Tanzania chicken meat.

Meat from female guinea fowl had higher fat content ( $24.18 \pm 2.19\%$ ) compared with male guinea fowl (with  $20.36 \pm 1.2\%$  respectively). Sanka and Mbaga (2014) reported higher fat content in Tanzania local chicken. Iman Rahayu *et al* (2008) also found that the fat content of red jungle fowl meat was significantly affected by sex with the female having higher value than their male counterparts. De Marchi *et al* (2005) reported no

difference between male and female in proximate composition except for percentage dry matter and ash where female has higher values.

**TABLE 1: Mean and SEM of proximate composition of male and female guinea fowl meat**

Parameters	Male	Female
Moisture content (%)	6.98 ± 0.16 <sup>a</sup>	6.51 ± 0.28 <sup>b</sup>
Crude protein (%)	33.22 ± 1.35	34.32 ± 0.99
Crude fibre (%)	0.00	0.0
Fat content (%)	20.36 ± 1.23 <sup>b</sup>	24.18 ± 2.19 <sup>a</sup>
Ash content (%)	2.98 ± 0.09 <sup>a</sup>	2.41 ± 0.28 <sup>b</sup>
Nitrogen free extract (%)	40.62 ± 4.70 <sup>a</sup>	32.58 ± 0.80 <sup>b</sup>

<sup>a,b</sup> Mean on the same row with different superscripts are significantly (P<0.05) different.

Table 2 shows the means and standard error of means of the organoleptic properties of male and female guinea fowl. The effect of sex of guinea fowl was not significant (p>0.05) on the meat colour in this study. Meat from male and female guinea fowl have similar value for colour. The colour of meat predominantly depends on the chemical state of myoglobin (Brewer, 2004; Mancini and Hunt, 2005), which is affected by the partial pressure of O<sub>2</sub>, the concentration of hydrogen ions (pH), temperature, light access, tissue structure, the presence of substrates and co-factors, the activity of reducing enzymes and lipid oxidation (Mancini and Hunt, 2005). Meat colour, one of the most important criteria in initial selection by the consumer, is related to the concentration of pigments, mainly myoglobin, and the chemical state of the myoglobin on the surface of the meat, the structure and physical state of muscle proteins (Beraiin *et al*, 2000). The effect of sex was however significant on taste, flavour, tenderness, juiciness and overall acceptability of guinea fowl meat.

Male guinea fowl meats were ranked better for taste, flavour, and overall acceptability while the meat from female guinea fowl had better ranking for juiciness and tenderness. Higher fat content in female indicate more juiciness and tenderness. Meat tenderness is one of the most important physical and sensory characteristics of meat (Bizkova and Tumova, 2010). Meat tenderness depends mainly on the post-mortem changes affecting myofibrillar proteins and on the connective tissue that represents the toughness (Arino *et al.*, 2006). In this study, the influence of sex of guinea fowl was significant on the meat samples. Meat samples from male guinea fowl was more tender than those obtained from their female counterparts. Omojola (2007) also reported significant effect of sex on flavour, tenderness and juiciness but found no significant effect on texture and overall acceptability of duck meat.

**TABLE 2: Mean and SEM of organoleptic traits of male and female guinea fowl meat**

Parameters	Male	Female
Colour	5.49 ± 0.16	5.32 ± 0.16
Taste	5.78 ± 0.13 <sup>a</sup>	5.56 ± 0.12 <sup>b</sup>
Flavour	5.74 ± 0.11 <sup>a</sup>	5.54 ± 0.12 <sup>b</sup>
Tenderness	5.68 ± 0.12 <sup>b</sup>	5.73 ± 0.13 <sup>a</sup>
Juiciness	5.42 ± 0.12 <sup>b</sup>	5.72 ± 0.12 <sup>a</sup>
Overall acceptability	.81 ± 0.11 <sup>a</sup>	5.67 ± 0.09 <sup>b</sup>

<sup>a,b</sup> Mean on the same row with different superscripts are significantly (P<0.05) different

## CONCLUSION

There is sexual dimorphism in the proximate composition and organoleptic traits of guinea fowl meat. In this study, male guinea fowl had higher moisture content, ash content and nitrogen free extract than female guinea fowl. The crude protein of meat from male and female guinea fowl were similar. Meat from female guinea fowl had higher fat content compared with male guinea fowl. Male guinea fowl meat had better taste, flavour, and overall acceptability while the meat from female guinea fowl had better ranking for juiciness and tenderness. There is no difference in the colour of male and female guinea fowl meat.

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