

# Growth Performance, Carcass Characteristics and Meat Quality of Pearl and Lavender Varieties of Guinea Fowl (*Numida Meleagris*) in Tropical Climate of Chhattisgarh

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## Abstract

The present experiment was carried out to study the growth performance, carcass characteristics and meat quality of Pearl and Lavender varieties of guinea fowl (*Numida meleagris*) upto 14<sup>th</sup> weeks of age in tropical climate of Chhattisgarh state in India. The study revealed that at one day average body weight of Lavender variety (25.18±0.46 g) was significantly (P< 0.05) higher than that of Pearl variety (23.30±0.36 g). However, no significant difference in mean body weight and body weight gain was observed in both varieties. The mean body weights of Pearl and Lavender guinea fowls at 14 weeks of age were 1120.78±10.70 g and 1097.88±10.99 g, respectively. The overall Feed Conversion Ratio during total experimental period of 14 week was observed to be significantly higher (P<0.05) in Lavender variety (4.94±0.24) than Pearl variety (5.18±0.26). No significant difference was observed in dressing percentage and other carcass traits between both varieties. Similarly no significant difference was observed between different sensory characters of both the varieties.

**Keywords:** Growth performance; Guinea fowl; Carcass characteristics; Meat quality

## Introduction

Indian poultry sector is chicken dominated and dependent on intensive system of production involving high technology with high external inputs. This is not necessarily appropriate and sustainable to the socio-economy of a densely populated country. Therefore there is a need to develop and offer a broad spectrum of poultry alternatives to meet the different local requirements. In this context, alternate poultry species which is sustainable to the landless, marginal and small farmers to

improve their socio-economic profile and nutritional status becomes very important.

Alternate poultry species like guinea fowl farming is slowly coming up in a sustainable manner through intensive farming. The guinea fowl which is still considered as semi feral has numerous advantages over village chicken. Guinea fowls are being reared in an extensive way for its gamy meat, watchfulness and ground clearance. The growth and production performance of any species of livestock heavily depend on

the environment. Being native to temperate South Africa, they appear to have an inherent adaptability to both heat and cold. The bird thrives well under both intensive and semi-intensive conditions, forages well, and requires little attention. It retains many of its wild ancestor's survival characteristics. It grows, reproduces and yields well in both cool and hot conditions; it is relatively disease free; it requires little water or attention, it is almost as easily raised as chickens and turkeys; and it is a most useful all-round farm bird. The guinea fowls have better ability to protect itself against predators and better resistance to common poultry parasites and diseases e.g. Newcastle disease and Fowl pox [1].

Guinea fowls are gaining popularity as meat birds in many developing countries including India under backyard as well as intensive system of rearing after broilers and turkeys. Guinea Fowl meat has been classed as a game meat and described by many as half way between a free range chicken and a pheasant with premium quality. Due to its delicacy and high nutritional value have shown interest to many researchers to study the performance of guinea fowls under different climatic conditions in different parts of the world under both traditional and intensive management conditions. The work conducted on the growth performance of guinea fowl in the tropical climatic condition of Chhattisgarh is very scant. Hence, the present investigation was carried out to study the growth performance of Pearl and Lavender varieties of guinea fowl along with their growth performance, carcass characteristics and meat quality in the tropical condition of Chhattisgarh state.

## Materials and Methods

The experiment was conducted in College of Veterinary Science and A.H., Anjora, Durg (Chhattisgarh), India. The district Durg of Chhattisgarh plain is located between Latitude of 20°23' - 22°02' N and the longitude of 80°46' and 81°58 E .and at a height of 317.00 M. above mean sea level. It has a dry tropical weather with an average rain fall of 1071.16 mm annually.

For the present study, 1 day old keets of Pearl and Lavender guinea fowl were procured from Central Poultry Development Organization, Bhubaneswar (Orissa) and growth performance was studied on fifty keets of each variety. The guinea fowl keets were divided into two groups depending on variety i.e. Pearl and Lavender. Further, each group was divided into five replicates of ten keets. The birds of each variety were raised separately on

deep litter system under standard managerial condition for 14<sup>th</sup> weeks of age. The birds were fed commercial Crumbro broiler starter ration produced by Godrej Agrovet Pvt. Ltd., Bangalore available in local market on *ad libitum* basis. The ration contained 10 % moisture, 20.4 % Crude protein, 3.9 % fat, 3.8 % Crude fiber, 8.8 % total ash, 1.8 % calcium and 0.7% phosphorus as determined by NIR Spectrometer. The body weight (g) of individual birds was observed at weekly interval to find out weekly body weight gain. Weekly feed consumption (g) by each replicates was recorded by subtracting the total amount of feed left from total amount of feed offered during same 7 days. The cumulative body weight (g), body weight gain (g), feed consumption (g) and feed conversion ratio (FCR) of both varieties were calculated, separately.

At the end of experimental period six numbers of birds from each group were randomly chosen and slaughtered following standard procedure. The selected birds were kept in separate coop without access to feed 16 hours prior to slaughter but provided drinking water. The birds were weighed prior to slaughter and dressed following the procedure described by [2]. They were bled through section of the jugular veins, scalded in warm water (about 60°C) and plucked manually. The legs and head were cut at tibio-metatarsus and atlanto-occipital joint, respectively and dressed weight and giblet weight were recorded and yields were expressed as a proportion of live weight. Carcasses were separated into Breast with ribs, Leg, Back with neck and wings to study cut- up parts as per the procedure described by Khanna & Panda [3] and weighed separately. For sensory evaluation of meat quality about 250 g of meat sample of each variety of guinea fowl was cut into small pieces and 1 per cent of salt was added in it. Then cooked in pressure cooker for 20 minutes in sim flame. The cooked meat was presented to a panel of semi trained judges under identical conditions. The score sheet developed by Peryan & Pilgrim [4] was followed for sensory evaluation of meat quality. The meat samples were judged to evaluate Colour, Flavour, Juiciness, Tenderness, Texture and Acceptance.

## Statistical Analysis

The data of all above parameters were recorded and expressed as mean  $\pm$  standard error. Parameters of both groups were compared using independent 't' test as per method given by Snedecor & Cochran [5]. The level of significance was reported at  $P < 0.05$ .

## Results

### Growth performance

The results on cumulative growth performance of Pearl and Lavender variety of guinea fowl (Table 1) revealed that at day one the mean body weight of Lavender guinea keets were significantly ( $P<0.05$ ) higher than Pearl guinea keets. But no significant differences were observed in mean body weight and weight gain between Pearl and Lavender variety at the end of experimental trial. The total feed consumption during 14 weeks of experimental period was significantly ( $P<0.01$ ) lower in Lavender group than Pearl group. However, overall FCR in Lavender group was significantly ( $P<0.05$ ) better than Pearl group.

Particulars	Pearl	Lavender	t value
Initial body weight (g)	24.80±0.36	25.18±0.46	3.22*
Final body weight(g)	1120.78±10.70	1097.88±10.99	1.49 <sup>NS</sup>
Weight gain (g)	1095.98±10.64	1072.70±10.98	1.62 <sup>NS</sup>
Feed intake (g)	5789.00±55.79	5392.98±49.84	6.03**
FCR	5.16±0.26	4.94±0.24	3.74*

\*Significant at  $P<0.05$ , \*\* Significant at  $P<0.01$ , NS: Non-significant.

Table 1: Growth performance of Pearl and Lavender varieties of guinea fowl.

**Carcass characteristics:** The carcass characteristics of Pearl and Lavender varieties of guinea fowl has been presented in (Table 2) In the present experiment no significant ( $P>0.05$ ) difference was observed in dressing percentage and other carcass cuts as giblet weight, breast weight, leg weight, back with neck weight and wing weight between both groups.

**Meat quality:** Nutritional values are indicative of nutrient contents in a food item and it is necessary to monitor intake of certain foods and nutrients. The nutritive value of meat is determined by proximate composition which varies according to species, age, feed and agro-climatic condition

Carcass Traits	Pearl	Lavender	t-value
Live Weight (g)	1375±88.73	1302.5±54.56	0.696 <sup>NS</sup>
Dressing %	78.24±1.41	77.06 ± 1.17	0.643 <sup>NS</sup>
Giblet Weight (g)	69.18±6.90	55.33±3.85	1.750 <sup>NS</sup>
Breast Weight (g)	272±21.07	259.33±17.49	0.463 <sup>NS</sup>
Leg Weight (g)	242.67±16.48	239.5±7.00	0.177 <sup>NS</sup>
Back with Neck Weight (g)	315.17±22.25	269.67±11.51	1.816 <sup>NS</sup>
Wing Weight (g)	140.5±13.88	140.67±4.70	0.01 <sup>NS</sup>

NS - Non-significant.

Table 2: Carcass characteristics of Pearl and Lavender guinea fowl at 14 weeks of age.

of the place of rearing of poultry. The mean values for different proximate parameters in meat of Pearl and Lavender groups have been shown in (Table 3) No significant ( $P>0.05$ ) differences were observed in values of moisture, crude protein, total ash and cholesterol content in meat between Lavender than Pearl Variety whereas, ether extract was found significantly ( $P<0.05$ ) higher in meat of Pearl variety. It was revealed that nutritive value of meat of Pearl and Lavender varieties of guinea fowl were almost similar.

Nutritive traits	Pearl	Lavender	t- value
Moisture (%)	68.16±0.79	69.44±0.67	1.479 <sup>NS</sup>
Crude Protein (%)	75.99 ± 1.36	78.37±1.79	1.403 <sup>NS</sup>
Ether Extract (%)	14.94 ± 1.49	11.31±0.67	3.177 *
Total Ash (%)	4.11 ± 0.24	4.39±0.23	0.912 <sup>NS</sup>
Cholesterol (mg/ 100 g meat)	68.15 ± 3.10	71.39±2.93	0.760 <sup>NS</sup>

\*Significant at  $P<0.05$ , NS: Non Significant.

Table 3: Nutrient composition of Pearl and Lavender guinea fowl meat.

The means and standard error of sensory attributes of Pearl control and Lavender groups has been presented in (Table 4). Data revealed no significant difference between different sensory characters of both the groups. However, the meat of Pearl variety was judged superior than Lavender variety in all other sensory attributes viz., flavor, juiciness, tenderness and texture.

Attributes	Pearl Control	Lavender	t value
Color	7.20±0.18	7.20±0.97	0
Flavour	7.20±0.31	6.40±0.68	0.676 <sup>NS</sup>
Juiciness	7.40±0.13	7.20±0.37	0.365 <sup>NS</sup>
Tenderness	7.80±0.12	7.60±0.40	0.365 <sup>NS</sup>
Texture	7.80±0.16	6.60±0.25	2.191 <sup>NS</sup>
Acceptance	8.00±0.20	7.20±0.58	0.930 <sup>NS</sup>

NS: Non Significant.

Table 4: Sensory attributes of Pearl and Lavender guinea fowl.

## Discussion

In the present study the mean body weights of both Pearl and Lavender variety differed non significantly with each other at 14 weeks of age. But Kozaczynski [6] revealed highly significant differences in body weight between different breeds of guinea fowl at different ages.. The mean body weights were higher at 14 weeks of age than observed by Fajemilehin [7] in Pearl, Ash and Black (599.24 ±0.62, 554.8±0.81 and 572.54 ±0.82 g, respectively) varieties of Greybreasted helmeted guinea fowl of Nigeria. The body weight of both varieties were lower than the values reported by Porwal et al. [8] for indigenous guinea fowl which might be due to genetically slower growth rate. Ayorinde and Ayeni [9] also reported that guinea fowls tend to be slow in growth. The significant effects of genetic groups might be the reason for differences in body weight of Pearl and Lavender guinea fowls as observed by Folasade & Obinna [10]. The lower body weights of guinea fowls in present investigation might be due to the diet containing low protein than recommended for guinea fowl (24-25%) in early age of growth i.e. upto 4 weeks of age [11]. Ayorinde

et al. [12] also suggested low live weight to be characteristics of guinea fowl. It could be due to the fact that the lower body weight and body structure of guinea fowl suited for rapid flight and fast running, which are evolutionary adoptions for survival in the wild (CAB International) [13]. Present findings were also in agreement with Fajemilehin [7]. Non- significant differences in body weight gain at 14<sup>th</sup> weeks of age suggested that the climatic condition of Chhattisgarh state is suitable for both Pearl and Lavender varieties.

In current study significantly (P<0.05) higher FCR was observed in Lavender guinea fowls. However, values for both varieties were better than 6.37±6.71 as observed by Seabo et al. [14] in guinea fowls fed commercial grower diet from 6 to 12 weeks of age under intensive system. The difference in FCR values between present and previous results could be due to age, difference of diets, management regime as well as environmental factors. Nwagu & Alawa [15] suggested that the wildly behavior, the characteristic timid but very active flighty and noisy temperament might be attributed to the lower feed conversion efficiency of guinea fowl.

The dressing percentage of both varieties in the present experiment were lower than report of Adeyemo and Oyejola, 2004 (87.4 %) and Mareko, et al. [16] (92.96-94.40%). But higher than Ayorinde [17] who reported dressing percentage of 65- 71 percent for guinea fowl and Nobo, et al. [18] who reported 75.82±2.99 in female and 74.10±2.99 in male birds. Similar findings were observed by Dahouda, et al. [19]. The variation in dressing percentages observed in different studies might be associated with the birds strain, diets, management system and carcass dressing methods. In the present investigation the breast weight, leg weight, back with neck weight and wing weight of both groups were higher than those observed by Dahouda, et al. [19]. Non significant differences between both varieties justifies that there was no effect of variety on carcass characteristics.

Mareko, et al. [16] observed lower moisture content (56.94±1.5 % for guinea fowls raised on concrete floor than the present findings for both varieties. The crude protein content in meat of Pearl guinea fowls in present experiment was higher than that observed in pork (16.6%), chicken (17.6%), lamb (17.9%), beef (18.9%) as reported by Holland, et al. [20]. Hoffman, et al. [21] & Khan, et al. [22] also reported lower crude protein value in breast muscle of South African broiler chicken (20.52-

21.35%) and in meat of white and coloured broiler lines, respectively (20-23%). The crude protein was higher than that reported by Saina in guinea fowls managed under intensive (75.4%) and semi-extensive (72.7%) system of management, respectively. The crude protein content in present investigation was in accordance with findings of Mareko et, al. [16] who observed 68.18±4.05 to 86.68±4.05 % crude protein. The differences in protein value in present and previous findings may be attributed due to differences in climate and rearing system. The ether extract (%) in present study was higher than that reported by Khan, et al. [22] in white and coloured broiler lines. The percentage of ash in both groups differed non-significantly and was similar to guinea fowls raised in high environmental temperature as observed by Maria, et al. [23] and under a typical intensive poultry system as observed by Mohamed, et al. [24]. In the present experiment since the guinea fowls reared on concrete floor were devoid of pecking of feed on ground and this might be the cause of comparatively lower total ash percent in meat of both varieties. The higher total ash content in meat of guinea fowl raised on concrete floor than soiled floor was also observed by Mareko, et al. [16]. The present study revealed that cholesterol (mg/ 100 g) in meat of Pearl and Lavender guinea fowl was 68.15±3.16 and 71.39±2.93, respectively differed non significantly. However, it was lower than meat of red coloured broiler (80.30±2.83 mg/100 g) as observed by Almeida, et al. [17] in their studies.

### Conclusion

The present study concluded that the FCR of Lavender variety was significantly better than Pearl variety whereas the mean body weight and body weight gain were not significant during 14 weeks of growth trial. Therefore, both varieties of guinea fowl can be reared in Chhattisgarh. The higher protein content in the guinea fowl than chicken meat and other meat sources indicated that guinea fowl might be the better alternative than other poultry species.

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