

Meat quality characteristics of sexed broiler chickens reared on deep litter and deep litter with a run housing types

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Target audience: Resource-poor poultry farmers, Poultry Scientists, Policy Makers

Abstract

This study determined meat quality characteristics of 300 sexed Arbor Acre broiler chickens reared on deep-litter and deep-litter with a run housing systems. After brooding for 2 weeks, a total of 75 male and female chicks, respectively were confined on deep litter and on deep litter with a run having three replications of 25 birds each. At the eighth week, two broiler chickens similar to the average weight from each replicate were slaughtered, dressed and the meat quality characteristics. The experiment was arranged in a 2 × 2 factorial layout and data obtained were subjected to completely randomized design. Female broiler chicken had higher percentage composition of dry matter while the male broiler chicken had higher percentage composition of fat and ash contents. In the sensory analysis, significant ($p < 0.05$) differences were found on boiled and grilled meat. Male birds had higher bone (17.41%) while the female recorded highest breast (22.90%) for birds on deep-litter in the meat: bone. Significantly ($p < 0.05$) higher breast meat (6.08) was obtained in boiled broiler chicken reared on deep litter with run. It was concluded that male and female broiler chickens on deep litter with run had improved meaty flavour and overall acceptability of boiled and grilled meats.

Keywords: Broiler chicken; cooking loss; meat: bone; sensory analysis

Description of the Problem

The challenge which continually faces broiler production is the provision of suitably designed house to provide optimum environment for maximum growth and production. In spite of provision of specially formulated feeds, vitamin supplements, antibiotics,

vaccines and other aids to intensive poultry production, the provision of appropriate housing type is still the most basic requirement for successful broiler chicken production (19). In the last decade, there has evolved several different housing methods in poultry production and this has brought to the

fore, organic poultry production impacted mainly by consumer demand and insistence.

Poultry meat quality is affected by the genotype, diet, age at slaughter and motor activity of birds, and their adaptation for outdoor production (7). In a study on meat composition and sensory values of two different strains of broiler chickens (18), significant differences were obtained between the strains on protein and dry matter components. In addition, different genotypes (breeds, lines) of slow-growing chickens have been tested in different alternative production systems and variation in poultry meat quality between alternative production systems was obtained (7).

Furthermore, it should be noted that in the production chain carcass and parts yields provide useful information to guide farmers as to strain, sex, and slaughter age options that would supply consumers' demands. Consumers prefer chickens with high yield of primal parts, such as breast, drumsticks, and thighs. Female chickens have more flesh than the male of similar weights because the male have relatively bigger or heavier bones which could be attributed to hormonal differences between the two sexes (6). Also, male and female broiler chickens of similar weights produce similar yields of the whole carcass and cut-up parts whereas muscle yield of the thigh is different (19). This study therefore evaluated the effects of deep litter and deep litter with a run housing system on the carcass yield and meat composition of male and female broiler chickens.

Materials and methods

Experimental Site

The experiment was carried out at the Poultry unit of the Directorate of University Farms (DUFARMS), Federal University of Agriculture, Abeokuta, Ogun State. The area lies on latitude 7°10'N and longitude 3°2'E, it is 76m above sea level and located in the tropical rainforest vegetation zone with an average temperature of 34.7°C and relative humidity of 82%.

Experimental Birds and Design

A total number of 300 Arbor Acre broiler breed of birds were purchased from a reputable hatchery and brooded for two weeks. Vaccination schedule and medications for broiler chicks were strictly adhered to. The birds were sexed after the second week of age using feather sexing and their weights were balanced. The 14 days old birds were subdivided into two sub-groups of housing types (deep litter and deep litter with a run) of 75 birds each thus making the study a 2x2 factorial experimental layout with four treatment groups. Each sub-group was replicated three times with 25 birds each. The treatment groups were as follow; Male broiler chickens on deep litter (MDL), Male broiler chickens on deep litter with run (MDLR), Female broiler chickens on deep litter (FDL) and Female broiler chickens on deep litter with run (FDLR).

Housing and diet

The birds were brooded on deep-litter for 2 weeks in confinement and fed *ad libitum* on starter diet. Thereafter, 150 male and female chicks were confined separately in deep-litter while the other

150 were confined separately in deep-litter with a run i.e. a mini-shelter with provision for perching. The deep litter housing system was a concrete floor with dwarf wooden wall of about (0.7m) from floor level with chicken mesh at the upper side for cross ventilation. The roof was made of corrugated Zinc sheet. Birds under intensive system were stocked at 0.08m²/bird. The same stocking density was used for the birds in deep-litter with a run with an open space of 2×2 m² for 25 birds used as the spacing for the run. The birds were fed *ad libitum* on both systems with the same quality and quantity of feed.

Experimental Diet

The birds were placed on commercial starter and finisher diets formulated to meet the nutrient requirement of the birds (14).

Meat Quality Analysis

Slaughter of birds/Determination of cooking weight loss

At the eighth week, the two broiler chickens (2 of 25 birds) which were similar to the average weight from each replicate were slaughtered by decapitation and properly bled, dressed and the meat quality characteristics such as the cooking loss, sensory analysis and meat to bone ratio of the breast and drumstick muscles were determined. Prior to slaughter, the birds were starved for about 18 hours to clear gut contents and thereby engender quality meat samples.

Meat samples from the boneless breast (pectoralis major) and drumstick (boneless) of birds reared under the different production systems and the sexes reared under each production

systems were weighed. Collected samples were transferred immediately to the laboratory in icebox. The weighed samples were placed in separate sealed polythene bag according to each group and cooked in a water bath for 15 minutes at 70^oC. After cooking, residual moisture was removed from each of the meat samples and the samples were allowed to cool to room temperature. The meat samples were re-weighed and differences in weight were obtained as weight loss (2).

$$\text{Cooking loss (g)} = \text{Raw weight} - \text{cooked weight}$$

$$\% \text{ Cooking loss} = \frac{\text{Cooking loss} * 100}{\text{Raw weight}}$$

Sensory Analysis

Samples (10 g) from the breast (boneless) and drumstick (boneless) muscles were washed individually in clean water, packed in a transparent double layer polythene bags and tagged for identification. Cooking procedures were identical for all meat samples (5 g each). Water was pre-heated up to 75^oC before placing the samples. The meat was cooked in polythene bags (30 microns) for 30 minutes. The other 5 g of the sample was grilled for about 20 minutes and were allowed to cool under room temperature (25 ^oC) and served to the panellists. The sensory evaluation of boiled and grilled meat samples from the breast and drumstick muscles were determined on the same day using seven experienced panellists who were not given any refreshment between samples. Each sample of about 1 cm³ was obtained, wrapped in aluminium foil and

coded. The samples were randomly served in colourless place at a temperature of 50°C. They were presented sequentially in partitioned booths equipped with yellow bulb light. Each trained panellist was required to masticate one sample per replicate with ranked preferences in the following categories: colour, juiciness, flavour, tenderness, saltiness and acceptability. A nine-point hedonic scale (3) was used, 1 referring to extremely dislike and 9 as extremely like.

Chemical Analysis

Meat samples from the breast were taken to the laboratory and analysed for proximate composition (4). Moisture was determined by drying at 102 °C. Ash was determined at 525 °C. Total lipids were analyzed by extraction with petroleum ether.

Statistical Design and Analysis

The experiment was arranged in a 2×2 factorial layout and the data obtained were subjected to Analysis of Variance in a Completely Randomized Design.

Significantly (p<0.05) different means were separated using Duncan's multiple range tests (17). The model in the factorial experimental layout is shown below:

$$Y_{ijk} = \mu + A_i + B_j + (AB)_{ij} + ?_{ijk}$$

where Y_{ijk} = individual observation; μ = general mean; A_i = effect of factor A (production systems, deep-litter and run); B_j = effect of factor B (sex; male and female); $(AB)_{ij}$ = effect of interaction AB (production systems * sex); and $?_{ijk}$ = experimental error.

Results

Effect of sex and housing type on meat chemical composition of broiler chicken

Figure 1 shows that female broiler chickens had relatively higher percentage composition of dry matter while the male broiler chickens had relatively highest percentage composition of fat and ash content. On the other hands, the birds managed on deep litter with run had relatively higher

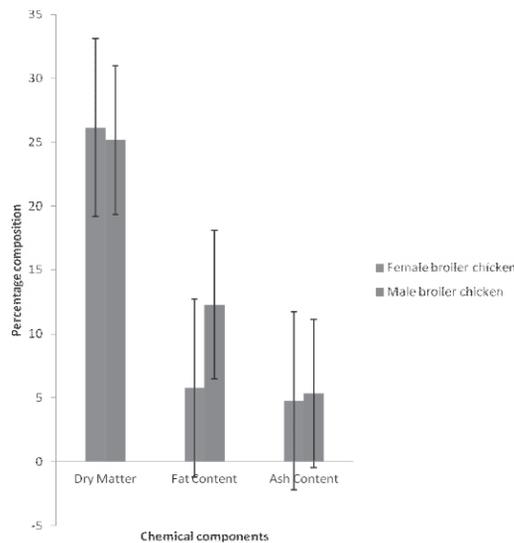


Figure 1. Effects of sex on breast chemical composition of broiler chickens

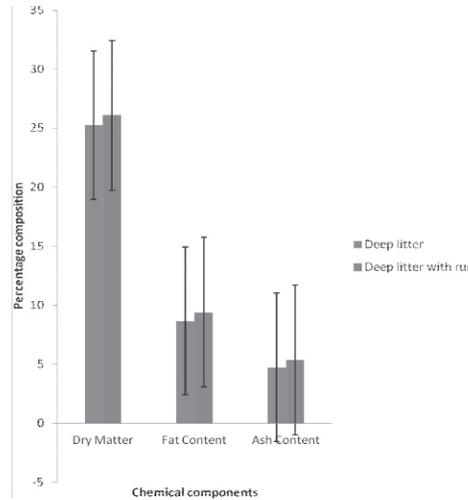


Figure 2. Effects of housing type on breast chemical composition of broiler chickens

percentage composition of dry matter, fat content and ash content (Figure 2).

Effect of sex and housing type on some performance indices and cooking loss of broiler chicken

Sex and housing type influenced ($p < 0.05$) the weight gain as shown in Table 1. The male broiler chicken was heavier than the female broiler chicken and birds reared on deep litter were heavier than those on deep litter with run. In Table 2, male broiler chickens on deep litter and deep litter with run were heavier ($p < 0.05$) than female on either of the housing types but female on deep litter had higher weight gain ($p < 0.05$) than female on deep litter with run. The cook weight loss of both the breast and drumstick muscle of the broiler chickens was not significantly ($p > 0.05$) influenced by the effects of interaction between sex and housing type.

Effect of sex and housing type on sensory analysis of boiled meat of broiler chicken

In Table 3, the housing type improved ($p < 0.05$) the meaty flavour and

tenderness of broiler chickens' drumstick in favour of deep litter with a run housing type. This same trend was observed in the meaty flavour and overall flavour of broiler chickens' breast in the housing type which were significantly higher (6.83 and 6.02, respectively) in broiler chickens on deep litter with a run than the value obtained in broiler chickens on deep litter housing type (6.06 and 5.32, respectively).

Table 4 shows that there were significant ($p < 0.05$) differences in the meaty flavour and overall acceptability of the drumstick with the meat of male broiler chickens on deep litter having the highest meaty flavour value of 6.89 and the meat of female broiler chickens on deep litter having the highest overall acceptability of 6.00. However, the meaty flavour of male broiler chickens on deep litter with run did not differ significantly ($p > 0.05$) from the meaty flavour of female broiler chickens on deep litter with run. The poorest meaty flavour was obtained from male broiler chickens on deep litter housing type.

Table 1. Main effect of sex and housing type on some performance indices and cook loss of broiler chickens

Parameter	Sex		Housing type	
	Female	Male	DL	DLR
Weight gain (g/bird/day)	38.87 ±1.11 ^b	44.41 ±0.58 ^a	42.83 ±1.02 ^a	40.44 ±1.74 ^b
Feed conversion ratio	2.82 ±0.09	2.72 ±0.04	2.67 ±0.04	2.86 ±0.07
Mortality (%)	2.00 ±1.37	1.33 ±0.84	0.00 ±0.00 ^b	3.33 ±1.23 ^a
Weight of Breast (g)	25.23 ±2.19	29.15 ±2.13	27.98 ±1.54	26.40 ±2.87
Cooking weight of Breast (g)	21.49 ±1.86	24.45 ±1.81	23.57 ±1.34	22.37 ±2.39
Cooking loss of Breast (g)	3.74 ±0.39	4.69 ±0.44	4.42 ±0.35	4.03 ±0.55
% Cooking loss of Breast	14.77 ±0.82	16.13 ±0.98	15.80 ±0.92	15.09 ±0.97
Weight of Drumstick (g)	20.65 ±4.09	13.92 ±1.29	14.85 ±1.72	19.72 ±4.19
Cooking weight of Drumstick (g)	17.89 ±3.84	11.08 ±1.18	11.91 ±1.58	17.07 ±3.95
Cooking loss of Drumstick (g)	2.76 ±0.35	2.83 ±0.49	2.95 ±0.52	2.65 ±0.29
% Cooking loss of Drumstick	14.32 ±1.57	20.64 ±4.00	20.30 ±4.12	14.66 ±1.52

^{a,b}: Means in the same row by factor with different superscripts differ significantly ($p < 0.05$)

DL = Deep litter; DLR = Deep litter with run

Table 2. Effect of interaction between sex and housing type on some performance indices and cook loss of broiler chicken

Sex Housing type Parameter	Female		Male	
	DL	DLR	DL	DLR
Weight gain (g/bird/day)	40.88 ±0.41 ^b	36.85 ±1.33 ^c	44.78 ±1.13 ^a	44.03 ±0.52 ^a
Feed conversion ratio	2.65 ±0.03 ^b	2.98 ±0.11 ^a	2.69 ±0.09 ^b	2.74 ±0.16 ^b
Mortality (%)	0.00 ±0.00	4.00 ±2.31	0.00 ±0.00	2.67 ±1.33
Weight of Breast (g)	27.53 ±2.82	22.93 ±3.27	28.43 ±1.95	29.87 ±4.29
Cooking weight of Breast (g)	23.61 ±2.52	19.37 ±2.55	23.53 ±1.63	25.38 ±3.59
Cooking loss of Breast (g)	3.93 ±0.30	3.57 ±0.80	4.91 ±0.52	4.49 ±0.81
% Cooking loss of Breast	14.35 ±0.46	15.20 ±1.74	17.25 ±1.37	14.99 ±1.29
Weight of Drumstick (g)	15.70 ±2.61	25.60 ±7.24	14.00 ±2.70	13.83 ±0.99
Cooking weight of Drumstick (g)	13.04 ±2.24	22.75 ±6.71	10.77 ±2.48	11.39 ±0.88
Cooking loss of Drumstick (g)	2.66 ±0.50	2.85 ±0.59	3.23 ±1.03	2.44 ±0.12
% Cooking loss of Drumstick	17.03 ±1.69	11.62 ±1.44	23.58 ±8.44	17.70 ±0.45

^{a,b,c}: Means in the same row with different superscripts differ significantly ($p < 0.05$)

DL = Deep litter; DLR = Deep litter with run

Sensory evaluation of the breast meat also showed significant ($p < 0.05$) differences on the juiciness, meaty flavour and overall acceptability with boiled meat of the female broiler chickens on deep litter with run recording highest values of 6.22, 6.96 and 6.19, respectively compared to the values obtained for meat of female broiler chickens on deep litter and meat of male broiler chickens on both deep litter and deep litter with run housing types. Male broiler chickens on deep litter recorded the lowest overall acceptability of the drumstick and breast

muscles whereas the values obtained for female broiler chickens on both housing types and male broiler chickens on deep litter with run housing type were significantly ($p < 0.05$) similar.

Effects of sex and housing type on sensory analysis of grilled meat of broiler chicken

The main effects of sex on the sensory values of grilled meat of broiler chicken (Table 5) showed significant ($p < 0.05$) difference only in the juiciness of the drumstick with the male having the highest value of 6.90. However, the housing type did not significantly

Table 3. Main effect of sex and housing type on sensory analysis of boiled meat of broiler chicken

Parameter	Sex		Housing type	
	Female	Male	DL	DLR
Drumstick				
Colour	5.67 ±0.22	5.61 ±0.27	5.65 ±0.24	5.63 ±0.25
Juiciness	5.39 ±0.29	5.85 ±0.19	5.65 ±0.21	5.59 ±0.27
Meaty flavour	6.04 ±0.22	5.67 ±0.29	5.04 ±0.24 ^b	6.67 ±0.23 ^a
Tenderness	6.04 ±0.23	6.19 ±0.22	5.79 ±0.22 ^b	6.43 ±0.22 ^a
Saltiness	4.85 ±0.25	4.96 ±0.21	5.02 ±0.26	4.79 ±0.20
Overall flavour	5.33 ±0.26	4.94 ±0.26	5.19 ±0.27	5.09 ±0.26
Overall acceptability	5.70 ±0.21	5.13 ±0.19	5.37 ±0.19	5.46 ±0.23
Breast				
Colour	6.37 ±0.20	6.09 ±0.25	6.17 ±0.23	6.29 ±0.22
Juiciness	5.52 ±0.25	5.93 ±0.26	5.48 ±0.25	5.96 ±0.25
Meaty flavour	6.52 ±0.18	6.37 ±0.23	6.06 ±0.22 ^b	6.83 ±0.18 ^a
Tenderness	5.39 ±0.25	5.43 ±0.26	5.35 ±0.24	5.46 ±0.26
Saltiness	5.50 ±0.26	5.35 ±0.24	5.63 ±0.25	5.22 ±0.25
Overall flavour	5.89 ±0.23	5.44 ±0.23	5.32 ±0.24 ^b	6.02 ±0.22 ^a
Overall acceptability	6.32 ±0.18	5.69 ±0.22	5.80 ±0.23	6.20 ±0.18

^{a,b}: Means in the same row by factor with different superscripts differ significantly ($p < 0.05$)

DL = Deep litter; DLR = Deep litter with run

Table 4. Effect of interaction between sex and housing type on sensory analysis of boiled meat of broiler chicken

Sex Housing type Parameter	Female		Male	
	DL	DLR	DL	DLR
Drumstick				
Colour	5.74 ±0.33	5.59 ±0.28	5.56 ±0.35	5.67 ±0.41
Juiciness	5.59 ±0.36	5.19 ±0.44	5.70 ±0.23	6.00 ±0.31
Meaty flavour	5.63 ±0.29 ^b	6.44 ±0.32 ^{ab}	4.44 ±0.36 ^c	6.89 ±0.34 ^a
Tenderness	5.74 ±0.32	6.33 ±0.32	5.85 ±0.32	6.52 ±0.29
Saltiness	4.89 ±0.38	4.82 ±0.33	5.15 ±0.35	4.78 ±0.23
Overall flavour	5.33 ±0.36	5.33 ±0.39	5.04 ±0.41	4.85 ±0.34
Overall acceptability	6.00 ±0.25 ^a	5.41 ±0.33 ^{ab}	4.74 ±0.22 ^b	5.52 ±0.32 ^{ab}
Breast				
Colour	6.48 ±0.26	6.26 ±0.31	5.85 ±0.38	6.33 ±0.33
Juiciness	4.81 ±0.33 ^b	6.22 ±0.32 ^a	6.15 ±0.34 ^a	5.70 ±0.38 ^{ab}
Meaty flavour	6.07 ±0.24 ^b	6.96 ±0.24 ^a	6.04 ±0.38 ^b	6.70 ±0.26 ^{ab}
Tenderness	5.26 ±0.34	5.52 ±0.36	5.44 ±0.35	5.41 ±0.39
Saltiness	5.82 ±0.37	5.19 ±0.35	5.44 ±0.33	5.26 ±0.36
Overall flavour	5.89 ±0.29	5.89 ±0.36	4.74 ±0.33	6.15 ±0.24
Overall acceptability	6.44 ±0.24 ^a	6.19 ±0.28 ^a	5.15 ±0.37 ^b	6.22 ±0.22 ^a

^{a,b,c}: Means in the same row with different superscripts differ significantly ($p < 0.05$).

DL = Deep litter; DLR = Deep litter with run

Table 5. Main effect of sex and housing type on sensory analysis of grilled meat of broiler chicken

Parameter	Sex		Housing type	
	Female	Male	DL	DLR
Drumstick				
Colour	6.77 ±0.29	6.77 ±0.21	6.70 ±0.27	6.83 ±0.24
Juiciness	5.80 ±0.32 ^b	6.90 ±0.21 ^a	6.47 ±0.26	6.23 ±0.31
Meaty flavour	6.70 ±0.23	6.80 ±0.26	6.60 ±0.29	6.90 ±0.19
Tenderness	5.87 ±0.27	5.50 ±0.28	5.57 ±0.29	5.80 ±0.26
Saltiness	4.93 ±0.26	4.70 ±0.28	5.10 ±0.29	4.53 ±0.23
Overall flavour	6.13 ±0.30	6.53 ±0.25	6.20 ±0.27	6.47 ±0.29
Overall acceptability	6.30 ±0.28	6.53 ±0.29	6.07 ±0.28	6.77 ±0.29
Breast				
Colour	6.63 ±0.30	6.17 ±0.26	6.37 ±0.31	6.43 ±0.26
Juiciness	5.43 ±0.34	5.77 ±0.35	5.53 ±0.33	5.67 ±0.36
Meaty flavour	7.17 ±0.24	6.47 ±0.28	6.53 ±0.28	7.10 ±0.24
Tenderness	5.97 ±0.32	5.77 ±0.30	6.07 ±0.30	5.67 ±0.32
Saltiness	4.83 ±0.29	4.37 ±0.27	4.80 ±0.31	4.40 ±0.26
Overall flavour	6.10 ±0.32	5.90 ±0.32	5.80 ±0.35	6.20 ±0.27
Overall acceptability	6.80 ±0.33	6.50 ±0.22	6.47 ±0.31	6.83 ±0.25

^{a,b}: Means in the same row by factor with different superscripts differ significantly ($p < 0.05$).

DL = Deep litter; DLR = Deep litter with run

Table 6. Effect of interaction between sex and housing type on sensory analysis of grilled meat of broiler chicken

Sex	Female		Male	
	DL	DLR	DL	DLR
Drumstick				
Colour	7.07 ±0.37	6.47 ±0.45	6.33 ±0.37	7.20 ±0.11
Juiciness	6.53 ±0.41 ^a	5.07 ±0.41 ^b	6.40 ±0.32 ^a	7.40 ±0.19 ^a
Meaty flavour	7.00 ±0.37 ^{ab}	6.40 ±0.27 ^b	6.20 ±0.45 ^b	7.40 ±0.19 ^a
Tenderness	6.00 ±0.38	5.73 ±0.39	5.13 ±0.42	5.87 ±0.36
Saltiness	5.00 ±0.38	4.87 ±0.36	5.20 ±0.46	4.20 ±0.26
Overall flavour	6.40 ±0.35 ^{ab}	5.87 ±0.49 ^b	6.00 ±0.41 ^{ab}	7.07 ±0.23 ^a
Overall acceptability	6.13 ±0.27	6.47 ±0.52	6.00 ±0.49	7.07 ±0.25
Breast				
Colour	6.20 ±0.49 ^{ab}	7.07 ±0.35 ^a	6.53 ±0.40 ^{ab}	5.80 ±0.31 ^b
Juiciness	4.87 ±0.42	6.00 ±0.51	6.20 ±0.45	5.33 ±0.51
Meaty flavour	6.87 ±0.34 ^{ab}	7.47 ±0.32 ^a	6.20 ±0.45 ^b	6.73 ±0.35 ^{ab}
Tenderness	6.00 ±0.39	5.93 ±0.52	6.13 ±0.46	5.40 ±0.39
Saltiness	5.07 ±0.42	4.60 ±0.42	4.53 ±0.45	4.20 ±0.31
Overall flavour	5.67 ±0.44	6.53 ±0.44	5.93 ±0.57	5.87 ±0.32
Overall acceptability	6.13 ±0.52 ^b	7.47 ±0.35 ^a	6.80 ±0.33 ^{ab}	6.20 ±0.29 ^b

^{a,b}: Means in the same row with different superscripts differ significantly ($p < 0.05$). DL = Deep litter; DLR = Deep litter with run

($p > 0.05$) influence the sensory values of the grilled meat of broiler chicken.

Table 6 shows the effects of interaction between sex and housing type on the sensory values of grilled meat of broiler chicken. There were significant ($p < 0.05$) differences in the juiciness, meaty flavour and overall flavour of the drumstick with that of male broiler chickens on deep litter with run having the highest values of 7.40, 7.40 and 7.07,

respectively. The highest overall flavour was obtained male broiler chickens on deep litter with run. Although, this value was significantly ($p < 0.05$) similar to the values obtained male broiler chickens on deep litter and female broiler chickens on deep litter. The colour, meaty flavour and overall acceptability of the grilled breast meat of the broiler chickens were also significantly ($p < 0.05$) highest in meat of female broiler chickens on deep

litter with run housing types with values; 7.07, 7.47 and 7.47, respectively.

Discussion

The significantly higher weight gain obtained in birds on deep litter housing type confirmed the findings (15) where considerably higher weight gain was recorded in birds on confinement compared with those on free range. Also, the higher mortality recorded in birds on deep litter with a run housing type was in line with the findings (15).

In this study, female broiler chickens had relatively higher percentage composition of dry matter while male broiler chickens had higher percentage composition of fat and ash content. This was similar to the findings (20) that ash content was affected by sex, with a higher value obtained in males. The mineral ash is associated with the organic compounds involved in the muscle contraction process, and its values increased as the bird grows (16). Male broiler chickens presented higher ash content as their muscle tissue percentage values is higher as compared to females. The birds managed on deep litter with run had higher percentage compositions of dry matter, fat content and ash content. This result obtained for the fat content contradicted the findings (6) that lipid ratios were decreased significantly in breast meat and drumsticks in an outdoor organic production system compared to a conventional broiler production system. The cook loss for both sexes was between 14-20%. This is in agreement with 20 % cooking loss (13; 21) for broiler chickens. The non-significant values observed in the cooking loss of

the breast and drumstick muscles for both sexes are corroborated (22) in the reports where no significant differences were observed in various characteristics of breast meat. Also, sex did not significantly influence the cook loss (9). However, a contrary result in the production system with a higher cook loss in thigh meat of organic broiler chickens compared to conventional broiler chickens (5).

Sex had no effect on the sensory values of boiled meats of breast and drumstick of broiler chickens. However, in the housing type, preference was given to the meat of the broiler chickens managed on deep litter with run in terms of meaty flavour of drumstick and breast meats, tenderness of the drumstick and overall flavour of the breast meat. This was contrary to reports in which there were no noticeable differences in sensory traits of capon meat reared in indoor and outdoor system (11). The report (12) that the differences in meat tenderness were detected by the sensory panel, whereas instrumental measures were not able to detect any difference corroborated the results of the present study. The significantly influenced meaty flavour in boiled broiler chicken is supported by the reports (1) that chemical reactions during cooking/boiling released many substances including volatile compounds that give aroma and flavour to the meat. This result showed that the meaty flavour of the meat of the drumstick of the male broiler chickens on deep litter with run was more preferred while the meats of the drumstick and breast of female broiler chickens on deep litter had the highest overall acceptability. The breast meat of

the female reared on deep litter with run was highly preferred in terms of juiciness, meaty flavour and overall acceptability. This is in line with the findings (10) that current consumers in many places preferred meat of animals reared outdoor to those reared indoor, although they do not recognize differences in meat sensory taste.

The housing type did not influence the sensory values of the grilled meat of broiler chickens. It was however observed that in terms of juiciness, meaty flavour and overall flavour, grilled drumstick meat of male broiler chickens reared on deep litter with run housing type was best while grilled breast meat of female broiler chickens was mostly preferred in terms of the colour, meaty flavour and overall acceptability. This observed preference resulted from the products brought about by temperature regime during grilling process which greatly influenced the sensory characteristics of the meat (8).

Conclusion and Application

- The meat flavour, tenderness and overall flavour of boiled broiler chickens were better in deep litter with run housing type.
- Grilling greatly influenced the sensory qualities of the drumstick and breast meat of male and female broiler chickens.
- The juiciness, meaty flavour and overall flavour of grilled drumstick meat from male broiler chickens reared on deep

litter with run housing type was best while grilled breast meat from female broiler chickens was mostly preferred in terms of the colour, meaty flavour and overall acceptability.

The following is recommended based on the results of this study: deep litter with run housing type should be adopted in the production of male and female broiler chickens for improved meat composition and sensory values.

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