Original Research

Influence of Sex Separate Rearing of Broiler Chicken on Their Carcass Characteristics

Sanghamitra Kalita, Kula Prasad Kalita, Reema Saikia and Ashok Talukdar

Assam Agricultural University, Assam, INDIA

***Corresponding author:** kalitasanghamitra82@gmail.com

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Abstract

An investigation was undertaken to compare the effect of sex separate rearing on the carcass characteristics of broiler chicken. Total 180-day old commercial chicks were divided into three treatment groups viz. mixed sex, male and female with three replicates in each. Dressed yield was significantly higher in male (71.56 ± 0.01) compared to mixed-sex (70.22 ± 0.05) and female (69.31 ± 0.07). Highest liver yield was observed in male (1.74 ± 0.13) than female (1.66 ± 0.03) and mixed sex (1.33 ± 0.03). Significantly higher giblet value was observed in male (3.17 ± 0.14) followed by female (3.06 ± 0.07) and mixed-sex (2.70 ± 0.05) respectively. The highest neck yield was observed in mixed-sex (5.43± 0.24) compared to male (4.82 ± 0.10) and female (4.54 ± 0.12) and female (36.03±0.68) showed highest breast yield compared to mixed-sex (36.02 ± 0.58) and male (33.75 ± 0.79).

Key words: Broiler Chicken, Carcass Characteristics, Sex Separate Rearing

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Introduction

Broiler farming is one of the most promising and sustainable businesses in agricultural sector and the fast growing phenomena are said to have been due to availability of improved germplasm, good quality feed and better care and management. One of the great economic problems of the broiler is that the broilers are not the same weight at market age. The growth pattern of male and female broilers is different. Under similar managemental conditions males grow faster, converts feed more efficiently, achieve marketable weight earlier and have less carcass fat (Kalita and Hazarika, 2014). Studies report that sexes influence the growth rates; females show higher breast proportion than males, but lower leg and thigh proportions. Sex differences are also known to influence carcass and abdominal fat deposition. The marking of poultry has been greatly diversified with a significant increase in cut up (parts) and processed products.

Materials and Methods

The experiment was carried out in the experimental shed of Instructional Poultry Farm, Department of Poultry Science, College of Veterinary Science, Assam Agricultural University, Khanapara, to assess the carcass characteristics of broiler chicken meat under sex separate rearing in deep litter system. For the present study, 210 numbers of day-old commercial broiler chicks having similar body weight from a single hatch was procured, wing banded and reared for 21 days under standard managemental practices and at 22 days of age, sex separation was done by observing the early appearance of comb in case of male birds, 180 birds were randomly selected from the flock and categorized into three treatment groups *viz.* T_0 (60 straight-run or mixed sex i.e. 30 males and 30 females), T_1 (60 males) and T_2 (60 females) which was further subdivided into 3 replicates with 20 chicks in each. The remaining birds were discarded. All the 3 treatment groups of broilers were reared separately and were maintained under uniform managemental condition with *ad libitum* broiler pre-starter, starter and finisher ration throughout the experimental period of 42 days (6 weeks). Commercial brand of broiler pre starter feed was given from 1st day to 12th day, starter feed was given from 13th day to 21st day and finisher feed was provided from 22nd day to 42nd day of age. All birds were offered *ad libitum* clean potable drinking water throughout the whole experimental period. The carcass quality was determined at the end of the experiment. Four birds from each replicate (total 36 numbers of birds) were randomly selected for carcass characteristics which included live weight, dressed weight, dressing percentage, and relative organ weights. Processing (slaughtering, bleeding, scalding, and de-feathering) of the birds were carried out following standard procedure. The dressed weight of the carcass was noted after removing head, shank, tip of wings and oil glands and expressed on the basis of pre-slaughtered live weight percentage. Evisceration was done by the method of Panda (1971). The gall bladder was detached from liver, heart was free from pericardium, internal clots and adhering vessels and the gizzards was cleaned by removing the inner lining and weighed separately to determine the weight of these organs and the giblet yields (liver, gizzard and heart) were calculated accordingly. After dressing, the giblet was retained with the carcass and the weight of the carcass with giblet was expressed as ready to cook weight which was expressed in terms of pre-slaughter live weight. These were weighted separately as relative weight (gm/kg live weight). Data were analyzed by using standard statistical method (One-way analysis of variance technique was used) in the year of 2016. The experiment was conducted for 6 weeks (42 days).

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Results and Discussion

The mean pre-slaughter live weight under the three different experimental groups were recorded as 2265.83 ± 101.29, 2428.33 ± 59.97 and 2186.25 ± 56.93 g for T_0 (mixed) group, T_1 (male) group, T_2 (female), respectively.

Table 1: Carcass traits (Mean ±SE) and relative organ weight (%) of broilers chicken of different sexes.

	Groups		
	T_0	T_1	T_2
Parameter	**(Mixed-Sex)**	**(Male)**	**(Female)**
Live weight (g)	2265.83^{a} ± 101.29	2428.33^{a}±59.97	2186.25^{a} ±56.93
Dressed yield (%)	70.22^{b} ± 0.05	71.56^{a}±0.01	69.31^{c}±0.07
Gizzard yield (%)	0.97^{a}±0.04	0.98^{a}±0.04	1.00^{a}±0.04
Liver yield (%)	1.33^{b}±0.03	1.74^{a}±0.13	1.66^{a}±0.03
Heart yield (%)	0.39^{a}±0.02	0.44^{a}±0.01	0.38^{a} ±0.02
Giblet yield (%)	2.70^{b}±0.05	3.17^{a}±0.14	3.06^{a}±0.07

Means bearing different superscripts within a row differ significantly (P≤0.05).

The analysis of variance revealed that the differences in average pre-slaughter body weight of broilers under the three different experimental groups were statistically non-significant (P>0.05) though marginal differences were existed. Similar findings were also reported by Veerapen and Driver (1999), Shahin and Elazeem (2005) and Azahan *et al.* (2007). This might be due to their genetic capability of which, male broilers can grow faster compared to female (Kalita and Hazarika, 2014). The mean dressed yield under the three different experimental groups was recorded as 70.22 ± 0.05, 71.56 ± 0.01 and 69.31 ± 0.07 for T_0 (mixed), T_1 (male) and T_2 (female) group respectively. The analysis of variance revealed, there was significant difference (P<0.05) of dressed weight among the three treatment groups. The findings are in line with the findings reported by Veerapan and Driver (1999), Ojedapo *et al.* (2008) and Beg *et al.* (2016).The dressing yield might be higher in T_1 (male) group due to the higher body weight in male than the females.

The mean gizzard yield under the three different experimental groups was recorded 0.97 ± 0.04, 0.98 ± 0.04 and 1.00 ± 0.04 % for T_0 (mixed sex), T_1 (male) and T_2 (female) group respectively. The analysis of variance revealed that there was no significant difference (P>0.05) among the 3 groups. In contrary to the present result, Ojedapo *et al*. (2008) recorded significantly (P<0.05) highest gizzard yield in male compared to the female. The mean liver yield under the three different experimental groups were recorded as 1.33 ± 0.03, 1.74 ± 0.13 and 1.66 ± 0.03 for T_0 (mixed sex) group, T_1 (male) group and T_2 (female) group respectively The analysis of variance revealed non-significant difference (P>0.05) between T_1(male) and T_2 (female) group, while T_0 (mixed sex) group was found to be significantly different (P<0.01) from other two groups. The higher liver yield may be due to the higher body weight and better growth pattern which may have subsequently influenced the liver weight. The mean heart yield under the three different

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experimental groups were recorded as 0.39 ± 0.02, 0.44 ± 0.01 and 0.38 ± 0.02 for T_0 (mixed sex), T_1 (male)and T_2 (female) group respectively. The analysis of variance revealed, statistically non-significant (P>0.05) though marginal differences were existed. This may be due to the higher male cardiac output (Sturkic, 1976), which normally involves oxygenation responsible for the heavier heart of the male broiler. This is in accordance with the findings of Laseinde and Oluyemi (1994).

The mean giblet yield under the three different experimental groups were recorded as 2.70 ± 0.05, 3.17 ± 0.14 and 3.06 ± 0.07 for T_0 (mixed sex) group, T_1 (male) group and T_2 (female) group respectively. The analysis of variance revealed, non-significant difference (P>0.05) between T_0 (mixed-sex) group and, T_2 (female) group, while T_1 (male) group was found to be significantly different (P<0.01) from other two groups. This finding is in accordance with the findings of Laseinde and Oluyemi (1994).

Table 2: Yield of various cut up parts (%) of broilers under different treatment groups.

Parameter	Groups		
	T_0	**T_1**	**T_2**
	(Mixed-Sex)	**(Male)**	**(Female)**
Neck (%)	5.43^{a}±0.24	4.82^{b}±0.10	4.54^{b}±0.12
Wing (%)	10.12^{a}±0.32	10.62^{a}±0.40	10.68^{a}±0.40
Back (%)	18.28^{a}±0.46	19.19^{a}±0.27	18.62^{a}±0.60
Breast (%)	36.02^{a}±0.58	33.75^{b}±0.79	36.03^{a}±0.68
Thigh (%)	14.19^{a}±0.37	14.42^{a}±0.43	13.65^{a}±0.40
Drumstick (%)	12.70^{a}±0.05	12.44^{a}±0.18	11.75^{a}±0.12

Means bearing different superscripts within a row differ significantly (P≤0.05).

In sex separate rearing of broilers, the per cent neck yield was found to have significant difference (P<0.05) when compared to the other two groups i.e. T_1 (male) and T_2 (female). Similarly, the per cent breast yield (%) was also found to differ significantly (P<0.05). However, numerically higher breast yield (%) is recorded in T_2 (female) group compared to T_0 (mixed sex) and T_1 (male) respectively. The higher breast yield was also found by Faria *et al.* (2010) and Sogunle *et al.* (2013). It might be due to sexual dimorphism of carcass conformation, with females presenting higher breast development. The per cent yield of cut up parts like wing, back, thigh and drumstick, did not differ significantly (P>0.05) among the different groups. In case of wing yield (%) numerically higher value was observed in T_2 (female) group followed by T_1 (male) and T_0 (mixed-sex) respectively. However, higher numerical value of back yield (%) was observed in T_1(male) group followed by T_2(female)and T_0(mixed-sex). Similar result was reported by Sam *et al.*(2010). In case thigh yield (%), numerically higher value was observed in T_1 group than the other 2 groups *i.e.*, T_0 (mixed-sex) and T_2 (female) respectively. In agreement with the present findings Sam *et al.* (2010) reported that the male had more back yield than the female broilers. Numerically higher value of drumstick was also seen in T_0 (mixed-sex) compared to the other 2 groups *i.e.* T_1 (male) and T_2 (female) respectively. Similar result was seen by Ojedapo *et al.* (2008).

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Conclusion

Now a day specified market requirement is obligatory. The female can be reared, dressed and sold as whole chicken; whereas the male carcasses will be exclusively used for deboning and various cut up parts with heavier carcass weight and high meat yield in the choice cut. The processing units and the wholesalers prefer to buy uniform sex separate flock. Sex separate rearing gives the possibility of better market value for the broilers at the time of marketing duo to flock uniformity. Therefore, this study aimed at separating the broilers into sexes and separately comparing the carcass characteristics.

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