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Comparative Study on the Carcass Traits of Commercial Native Chicken, Backyard Native Chicken, Commercial Broiler and Spent Layer Chicken

R. Sathishkumar, V. V. Kulkarni*, V. Chandirasekaran, P. Vasan1 and M. Muthulakshmi

Department of Livestock Products Technology (Meat Science), 1Department of Animal Nutrition, Veterinary College and Research Institute, Namakkal-637002, India

ABSTRACT

To study the effect of class of chicken on the carcass traits an experiment was conducted on 12 birds of either sex in each commercial native chicken, backyard native chicken, commercial broiler and spent layer chicken. Birds were slaughtered by Jatka method and carcass traits were recorded. Live weight, dressed carcass weight, dressing percentage and meat: bone ratio was significantly higher (P<0.01) in commercial native chicken, commercial broiler and backyard native chicken than spent layer chicken. Meat bone ratio was significantly (P<0.01) higher in commercial broiler than backyard native chicken. Yield of giblet was significantly higher (P<0.01) in backyard native chicken than the other three groups. Influence of sex was significant in all the parameters and higher values were recorded in males than females for dressing percentage and meat bone ratio. The dressing percentage and meat bone ratio was higher in the commercial broiler.

Keywords: *Carcass traits, Meat bone ratio, Indigenous and broiler poultry*

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INTRODUCTION

Meat is an excellent source of good quality animal protein which provides all the essential amino acids and various micro nutrients in proper proportion to the human beings. Meat consumption in India is increasing and poultry meat is the most popular meat due to its affordability, small size of the bird and is out of religious taboos. Commercial broilers contribute up to 85-90 % of chicken meat in India and the remaining 10-15 % comes from the native local chickens from unorganised markets (Rajkumar et al., 2016). The commercial broilers are fast growing with high feed conversion efficiency compared to native local chicken which are slow growing, poor feed converters but often preferred for their better flavored meat. A total of 19 native chicken breeds have been recognized and registered as indigenous breeds of chicken in India (NBAGR, 2019). Aseel is one of the most popular indigenous breeds. In recent years, consumers are increasingly interested in meat from indigenous and local birds because of desirable and unique taste, rich flavour and firm texture and higher price is paid for native chicken. A research work was planned with objective of studying the comparative carcass traits and meat yield in commercial native chicken, backyard native chicken, commercial broiler and spent layer chicken.

MATERIALS AND METHODS

A study on carcass characteristics of commercial native chicken, backyard native chicken, commercial broiler and spent layer chicken was undertaken at the Department of Livestock Products Technology (Meat Science), Veterinary College and Research Institute, Namakkal - India. Total 48 birds, birds (6 males and 6 females) in each group, of commercial native chicken (CNC) (6 months of age), backyard native chicken (BNC) (5 ½ months of age), commercial broiler (CBC) (38 days old) and spent layer chicken (SLC) (71 weeks for male birds and 80 weeks for female) were purchased from the local markets and local poultry farms. The birds were given rest and off fed overnight. They were individually weighed and subjected to ante – mortem inspection and slaughtered by Jhatka method as per the standard slaughter procedure. Skin and feather was removed manually and the carcass temperature was noted in breast and thigh region using a probe thermometer. After evisceration, a detailed post-mortem inspection was carried out and then the carcasses were fabricated. The edible and inedible offal were separated and weighed: heart, liver gizzard, bone, blood, feather and skin, shank, wings, head, neck, lung and trachea and digestive tract. The parameters recorded were dressing percentage, meat bone ratio, giblet and inedible offal weight as per Sobana et al (2011) and Devatkal et al (2018). The data generated from the slaughter study were pooled and statistically analysed as per the procedure of Snedecor and Cochran (1994) using SPSS Statistics 15.0 software package.

RESULTS AND DISCUSSION

The least-square mean values (±S.E) for live weight (g), carcass weight (g), dressing percentage and meat: bone ratio of commercial native chicken, backyard native chicken, commercial broiler and spent layer chicken are presented in Table 1 along with level of significance. Significantly higher dressing percentage (without skin) and meat: bone ratio, was observed in CNC, BNC, CB than SLC. The dressing percentage was within normal range (65-75 %) as observed by many authors Muthukumar et al. (2011) in broiler; Rao and Ranganadham (2011) in broiler; Haunshi et al. (2013) in Aseel and Kadaknath; Rajkumar et al. (2016) in Aseel and broiler; Singh and Pathak (2016) in broiler; Devatkal et al. (2016) in broiler and Aseel from India. Similar observations for dressing percentage and meat bone ration were reported by Patel et al. (2014) in Gramapriya. Dressing percentage of SLP recorded in the present study was in agreement with the report of Kondaiah and Panda (1987) and Sobana et al. (2011).

Dressing percentage is related to the age of the bird, as the age advances dressing percentage reduces due to shrinkage of muscles. In present study dressing percentage of SLC was significantly (p<0.01) lower than other categories. Singh and Pathak (2016) reported lower values of dressing percentage and meat bone ratio in broiler, Vanaraja, Aseel, and Kadaknath birds in the present study. However in present study the lower meat bone ratio value was recorded in BNC, this could be due to the breed and age difference.

*Corresponding author E-mail address: vvkul@rediffmail.com

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Table 1: Carcass characteristics (mean ±S.E) of commercial native chicken (CNC), backyard native chicken (BNC), commercial broiler (CB) and spent layer chicken (SLC)

Main effect/ sub class	Live weight (g)	Dressed carcass weight (g)	Dressing percentage	Meat bone ratio	Weight of giblet (g)	Per cent yield of giblet	Weight of Inedible offal (g)	Per cent yield of Inedible offal
Over all mean	1775.33 ± 42.43 (48)	1150.27 ± 38.04 (48)	64.21 ± 0.88 (48)	1.74 ± 0.02 (48)	68.73 ± 1.51 (48)	3.91 ± 0.08 (48)	549.02 ± 12.58 (48)	31.19 ± 0.56 (48)
Group	**	**	**	**	**	**	**	**
CNC	2038.33 a ± 94.08 (12)	1377.17 a ± 72.67 (12)	67.39 a ± 0.79 (12)	1.80 a ± 0.02 (12)	72.92 ab ± 1.92 (12)	3.62 b ± 0.12 (12)	631.08 a ± 26.54 (12)	31.13 b ± 0.85 (12)
BNC	1693.00 bc ± 62.14 (12)	1110.17 b ± 38.50 (12)	65.63 a ± 0.51 (12)	1.65 b ± 0.04 (12)	76.08 a ± 2.49 (12)	4.50 a ± 0.13 (12)	521.00 b ± 16.74 (12)	30.90 b ± 0.62 (12)
CB	1866.17 ab ± 46.87 (12)	1282.58 ab ± 31.08 (12)	68.74 a ± 0.21 (12)	1.79 a ± 0.01 (12)	70.25 b ± 1.64 (12)	3.77 b ± 0.07 (12)	508.75 b ± 16.22 (12)	27.35 c ± 0.47 (12)
SLC	1503.83 c ± 38.75 (12)	0831.17 c ± 36.55 (12)	55.06 b ± 1.32 (12)	1.73 ab ± 0.04 (12)	55.67 c ± 2.06 (12)	3.72 b ± 0.16 (12)	535.25 b ± 28.01 (12)	35.37 a ± 1.08 (12)
Sex	**	**	**	**	*	**	**	*
Male	1914.96 a ± 61.63 (24)	1253.67 a ± 53.65 (24)	64.00 a ± 0.87 (24)	1.77 a ± 0.03 (24)	70.79 a ± 2.63 (24)	3.66 b ± 0.11 (24)	600.79 a ± 16.99 (24)	31.82 a ± 1.03 (24)
Female	1635.71 b ± 43.17 (24)	1046.88 b ± 45.91 (24)	63.42 b ± 1.53 (24)	1.71 b ± 0.02 (24)	66.67 b ± 1.44 (24)	4.15 a ± 0.08 (24)	497.25 b ± 11.23 (24)	30.56 b ± 0.45 (24)

Figures in parentheses are the number of observations; NS- not significant; *p<0.05; **p<0.01

Means with same superscript within classes dot not differ significantly (p>0.05).

Table 2: Mean (±S.E) of carcass characteristics of male and female commercial native chicken (CNC), backyard native chicken (BNC), commercial broiler (CB) and spent layer chicken (SLC)

Group	Live weight (g)	Dressed carcass weight (g)	Dressing percentage	Meat bone ratio	Giblet weight (g)	% Giblet yield	Inedible offal weight (g)	% Inedible offal yield
CNC	**	**	NS	NS	NS	**	**	NS
Male	2288.33 b ± 115.04	1558.33 b ± 94.05	67.96 a ± 1.06	1.80 a ± 0.03	75.33 a ± 2.67	3.31 a ± 0.11	697.83 b ± 32.82	30.70 a ± 1.56
Female	1788.33 a ± 26.66	1196.00 a ± 35.53	66.83 a ± 1.23	1.79 a ± 0.03	70.50 a ± 2.60	3.94 b ± 0.11	564.33 a ± 15.48	31.57 a ± 0.81
BNC	*	NS	*	NS	**	NS	**	NS
Male	1813.50 b ± 67.30	1172.33 a ± 45.69	64.62 a ± 0.50	1.65 a ± 0.06	83.33 b ± 2.06	4.62 a ± 0.19	569.17 b ± 12.66	31.52 a ± 0.88
Female	1572.50 a ± 81.57	1048.00 a ± 53.74	66.65 b ± 0.71	1.66a ± 0.05	68.83 a ± 1.42	4.42 a ± 0.18	472.83 a ± 12.01	30.28 a ± 0.88
CB	*	NS	NS	NS	NS	NS	NS	*
Male	1956.67 b ± 38.67	1341.50 a ± 27.62	68.55 a ± 0.11	1.81 a ± 0.02	71.83 a ± 2.47	3.67 a ± 0.08	515.67 a ± 10.46	26.36 a ± 0.24
Female	1775.67 a ± 69.98	1223.67 a ± 45.82	68.94 a ± 0.41	1.76 a ± 0.01	68.67 a ± 2.17	3.88 a ± 0.11	501.83 a ± 16.22	28.35 b ± 0.72
SLC	**	**	**	**	NS	**	**	**
Male	1601.33 b ± 33.00	942.50 b ± 21.78	58.84 b ± 0.85	1.84 b ± 0.08	52.67 a ± 2.81	3.29 a ± 0.16	620.50 b ± 18.45	38.71 b ± 0.62
Female	1406.33 a ± 46.29	719.83 a ± 21.12	51.27 a ± 1.12	1.62 a ± 0.02	58.67 a ± 2.67	4.17 b ± 0.07	450.00 a ± 14.32	32.03 a ± 0.49

n=6; NS- not significant; *p<0.05; **p<0.01

Means with at least one common superscript within classes dot not differ significantly (p>0.05).

Padhi et al. (2012) recorded lower dressing percentage values of Vanaraja (63.87) and broilers (65.04) than in the present study. Dressing percentage of spent layer chicken (55.06) recorded in the present study was lower than the values reported by Muthulakshmi et al., 2016, (62.39). It might be due to the calculation of dressing percentage with skin. Dressing percentage also depends on fasting of birds before slaughter. Meat bone ratio recorded in both the sexes in present study was lower than the report of Singh and Pathak (2016) in adult Vanaraja birds and Devatkal et al., (2018) in broiler and Aseel. In the present study only leg and breast meat was taken for calculating meat bone ratio, while Devatkal et al., (2018) added all the cut off parts for calculating meat bone ratio. Difference in the meat bone ratio values might be due to breed and age of the birds. In the present study the leg meat weight was significantly higher ($p<0.01$) than breast meat in backyard native chicken than other categories. The yield of giblets (edible offal) was significantly higher in BNC than CNC, CB and SLC (Table 1). The higher yield of edible offal also contributes to the profit margin. The yield of giblet in all the four categories of bird in present study was lower than the report of Devatkal et al., (2018) in Aseel and commercial broiler birds and Marapana, (2016) in broiler birds (4.85 per cent) but in agreement with the report of Haunshi et al., (2013) in Aseel birds and Patel et al., (2014) in Gramapriya birds.

The yield of giblet recorded in present study (3.66 for males and 4.15 for females) was lower than the report of Singh and Essary, (1974) in broilers .The total yield of giblet in all four categories of birds was also lower than reported by Padhi et al., (2012). The higher values for giblets in backyard chicken especially gizzard weight also reflected on the free range feeding system and development of gizzard. The percent yield of inedible offal was significantly lower in CB than other categories (Table 1). The results were in agreement with the report of Padhi et al. (2012) in Vanaraja and commercial broiler and Patel et al. (2014) in Gramapriya birds. Muthulakshmi et al., (2016) in spent layer chicken recorded the higher values of inedible offal in male than female than recorded in the present study in all four categories of birds.

Form the results it was concluded that dressing percentage in commercial broiler was significantly higher than commercial native chicken, backyard native chicken and spent layer chicken. Meat bone ratio was significantly lower in backyard native chicken. Overall yield of edible offal was higher in backyard native chicken and yield of inedible offal was least in commercial broiler. Hence based on the higher dressing percentage and meat bone ratio the commercial broiler were superior to other classes.

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