Haryana Vet. (June, 2023) **62(1),** 97-100 ISSN 0033-4359 (P) **Research Article**

COMPARATIVE STUDY ON GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF KADAKNATH WITH COMMERCIAL CHICKEN BROILER

MUKESH MALIK, DEVENDER SINGH BIDHAN and RAVI KUMAR*
Department of Livestock Production Management, Collage of Veterinary Sciences,
Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar-125 004, Haryana, India

Received: 13.08.2021; Accepted: 15.01.2022

ABSTRACT

Two hundred and twenty five day old chicks, out of which 180 Kadaknath and 45 Vencobb-400 chicks were randomly divided into five treatments (T_0 -Vencobb-400, T_1 to T_4- Kadaknath) with three replicates of 15 chicks in each with three different feed regime (T_0 and T_1 control with BIS 2007 standard ration, T_2 has 10% less CP, T_3 has 10% less ME and in T_4 has both 10% less CP as well as ME than BIS 2007 standard ration). Standard management practices were adopted throughout the experimental period. The commercial strain had significantly (P 0.05) higher body weight, weight gain, better feed consumption and feed conversion ratio compared to Kadaknath chicken. Among carcass characteristics drawn percentage, eviscerated weight percentage, giblets weight percentage and total meat bone ratio showed significant better results in commercial strain. Fat and protein values in the leg and breast meat were found to be better in all treatment groups of Kadaknath in comparison to commercial groups.

Keywords: Body weight, Carcass characteristics, Feed conversion ratio, Kadaknath

How to cite: Malik, M., Bidhan, D.S. and Kumar, R. (2023). Comparative study on growth performance and carcass characteristics of Kadaknath with commercial chicken broiler. *Haryana Vet.* **62(1)**: 97-100.

The poultry industry during the past four decades has been one of the most dynamic and ever-expanding sectors in India. According to the 20th livestock census, total poultry population in the India is 851.81 million, which increased by 16.8% over the previous livestock census. Out of which 317.07 million is backyard population and 534.74 million is commercial poultry population which are increased by 45.8% and 4.5% over the previous livestock census, respectively. Poultry meat is considered as nutrient dense food which is desirable in planning healthy diets. In recent times, people are looking for quality meat rather than quantity. Many studies have been done which found that the commercial poultry meat might be one of the reasons for antibiotic resistance in human being due to presence of antibiotic residue in their meat. In the present time, people are moving towards the production of organic meat which has higher carcass quality, minimum or no antibiotic residue and higher market price. This may be one of the reasons behind the backyard poultry population increase against the commercial poultry population in last livestock census. Indigenous chickens are an important source of animal proteins. The famous indigenous Kadaknath breed, also known as kalimashi, is known for its black colored meat. The meat and eggs of Kadaknath are also reckoned to be a rich source of protein. Due to its high protein and very low fat and cholesterol level, it is in high demand nowadays. The fat content in Kadaknath meat is 0.73-2.8% as compared to 1.3 to 7.5% in most other exotic chicken breeds. The meat of the Kadaknath breed contains a high percentage (25.47%) of protein and is believed to have aphrodisiac properties. This study was planned with the objectives to study growth performance and the carcass quality traits of experimental birds of Kadaknath and commercial broiler chicken.

*Corresponding author: ravighotar@gmail.com

MATERIALS AND METHODS

The present investigation was conducted to study the comparison of growth performance of Kadaknath broilers with that of commercial strain from day old to 8 weeks of age, at the Poultry shed of the Department of Livestock Production Management, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS), Hisar. The experiment was approved by the Institutional Animal Ethics Committee held in the month of April, 2019. Two hundred and twenty five day old chicks, out of which 180 Kadaknath and 45 Vencobb-400 chicks were randomly divided into five treatments (T_0 -Vencobb-400, T_1 to T_4- Kadaknath) with three replicates of 15 chicks in each with three different feed regime (T_0 and T_1 control with BIS 2007 standard ration, T_2 has 10% less CP, T_3 has 10% less ME and in T_4 has both 10% less CP as well as ME than BIS 2007 standard ration). All the five treatment groups were reared under deep litter system. Standard management practices were adopted throughout the experimental period. Body weight of birds were recorded every week of age up to 8 weeks in the morning before feeding by using electronic weighing balance. Birds were provided with ad libitum experimental feed (known weight) during the experimental period and at the end of each week, the left over feed was weighed back and net feed consumption was calculated for each treatment. Feed efficiency was cal-

culated weekly up to 8 weeks of age. At the end of the experiment, one bird from each replication was randomly selected for carcass characteristic study.

$$FCR = \frac{\text{Total feed consumed (g)}}{\text{Total body weight gain (g)}}$$

$$\text{Dressed weight} = \text{Live weight} - (\text{Weight of blood} + \text{feathers} + \text{shanks} + \text{head})$$

$$\text{Dressing percentage} = \frac{\text{Dressed weight} \times 100}{\text{Live weight}}$$

$$\text{Eviscerated weight} = (\text{Dressed weight} - \text{Weight of viscera})$$

$$\text{Eviscerated weight percentage} = \frac{\text{Eviscerated weight} \times 100}{\text{Live weight}}$$

$$\text{Drawn percentage} = \frac{\text{Drawn weight} \times 100}{\text{Live weight}}$$

Statistical analysis

Data obtained were subjected to statistical analysis as per Snedecor and Cochran (1994) using Completely Randomized Design (CRD). All the data were subjected to ANOVA using the General Linear Models procedure of SPSS-23 software (SPSS, 2019). The mean differences among different treatments were separated by Duncan's multiple range tests. Consequently, a level of $P<0.05$ was used as the criterion for statistical significance (Duncan, 1955).

RESULTS AND DISCUSSION

Body weight and weight gain:

The body weight and weight gain were shown in table (1) & table (2) respectively. The average body weight and weight gain of Kadaknath chicks were observed to be statistically non-significant amongst themselves in treatments (T_1 to T_4) at all ages but commercial strain (T_0) showed significant differences from Kadaknath (T_1 to T_4) at all age groups.

Similarly to the present findings, the study done by Singh and Pathak (2016) showed a significant ($P<0.05$) higher live weight in Cobb-400 (commercial strain) as compared to all indigenous breeds including Kadaknath.

Feed consumption/bird

The mean feed consumption of broilers remained significantly higher (P 0.05) in the commercial strain (T_0) than Kadaknath in all treatments (T_1 to T_4) at all age groups and Kadaknath also showed significant differences among them at all age groups as presented in Table 3. The results were similar to the findings of Mandal *et al.* (2001-02) and Elangovan *et al.* (2004) who reported comparative influence of feed intake in Naked Neck×CARI Red chicks due to dietary treatments with crude protein of 18, 16, 14 and 12 percent.

Feed Conversion Ratio:

The mean weekly FCR values of Kadaknath chicken (T_1, T_2, T_3 and T_4) were significantly higher ($P<0.05$) as compared to commercial strain group (T_0) presented in Table 4. Results of weekly feed consumption revealed that feed consumption was significantly ($P<0.05$) increased among all treatment groups of Kadaknath in comparison to commercial strain group at all age groups. Similarly, significantly better FCR was observed in the commercial strain (T_0) birds than Kadaknath under different growth periods.

Homologous to the present study, Rathod *et al.* (2018) found that feed conversion ratio in Kadaknath was significantly poor. The findings are in accordance with Devi and Reddy (2005) who reported that the birds fed on low protein diet *viz*. 18, 19 and 20% showed similar feed efficiency but had non-significant ($P>0.05$) effect with birds fed on a diet containing 16% CP.

Carcass characteristics:

The proximate composition of broiler meat was shown in table 5. Significant ($P<0.05$) differences were observed in commercial strain with that of Kadaknath among various treatments of present investigation for eviscerated weight percentage, giblets percentage, drawn weight percentage, dressing percentage and total meat bone ratio Kadaknath did not show any significant difference amongst themselves.

In leg meat, moisture values were showed no significant difference ranging from 67.67 (T_3) to 69.3 (T_4). Ash, protein and fat contents of leg portion differ significantly ($P<0.05$) among treatment groups ranging from 0.31 (T_3 and T_4) to 1.26 (T_0), 16.33 (T_0) to 20.87 (T_1) and 1.82 (T_4) to 6.73 (T_0), respectively. Similarly, in breast portion ash, fat and protein values differ significantly ($P<0.05$) among treatment groups ranging from 0.31 (T_3 and T_4) to 1.74 (T_0), 0.96 (T_3) to 1.28 (T_0) and 19.53 (T_0) to 24.87 (T_0), respectively while moisture content showed no significant results ranging from 68.77 (T_1) to 69.43 (T_4).

In the case of Kadaknath, Haunshi *et al.* (2013) reported similar values of dry matter and protein percentage (23.9% in breast) whereas higher fat in breast muscle (1.6%) and leg muscle (0.81%) in comparison to present study.

In contrast to the present study, lower protein (20.8% in breast) and higher ash content (1.19% in breast) in Kadaknath were reported by De Marchi *et al.* (2005) and Ali *et al.* (2007).

Indigenous chicken of North Eastern region of India

Table 1. Mean of average body weight (g/bird) during different growth periods under different experimental feed regime

Age (days)	Treatments				
	T_0	T_1	T_2	T_3	T_4
0	48.64^{b}±0.46	28.04^{a}±0.39	28.62^{a}±0.23	28.69^{a}±0.43	28.07^{ca}±0.32
7	109.82^{b}±1.50	37.84^{a}±0.83	38.49^{a}±0.71	38.53^{a}±0.98	38.31^{a}±0.87
14	263.62^{b}±5.33	63.31^{a}±1.98	61.27^{a}±1.93	59.56^{a}±1.97	57.33^{a}±1.79
21	498.84^{b}±10.43	103.02^{a}±3.77	101.96^{a}±3.02	98.27^{a}±3.18	95.8^{a}±3.36
28	718.84^{b}±17.81	145.84^{a}±5.62	142.4^{a}±4.62	138.53^{a}±4.63	135.58^{a}±4.42
35	979.8^{b}±19.78	187.96^{a}±6.74	181.71^{a}±5.73	181.98^{a}±5.98	173.44^{a}±4.95
42	1376.22^{b}±16.68	242^{a}±8.11	241.44^{a}±7.75	245.2^{a}±7.50	226.96^{a}±6.38
49	1586^{b}±22.44	305.24^{a}±10.45	297.18^{a}±9.49	307.78^{a}±9.55	288.42^{a}±8.45
56	1866.49^{b}±16.99	378.84^{a}±12.38	367.51^{a}±11.57	387.51^{a}±11.13	362.89^{a}±9.77

Values are means ± standard error; Means values with different superscript in a row differ significantly (P<0.05)

Table 2. Mean weight gain/bird/week (g) of broilers during different growth periods under different experimental feed regime

Age (weeks)	Treatment				
	T_0	T_1	T_2	T_3	T_4
1	61.18^{b}±1.58	9.8^{a}±0.69	9.87^{a}±0.67	9.84^{a}±0.81	10.24^{a}±0.74
2	153.8^{b}±5.13	25.47^{a}±1.44	22.78^{a}±1.60	21.02^{a}±1.30	19.02^{a}±1.26
3	235.22^{b}±9.16	39.71^{a}±1.97	40.69^{a}±1.74	38.71^{a}±2.04	38.47^{a}±2.05
4	220^{b}±14.11	42.82^{a}±2.32	40.44^{a}±1.97	40.27^{a}±2.15	39.78^{a}±2.22
5	260.96^{b}±13.77	42.11^{a}±2.17	39.31^{a}±1.88	43.44^{a}±2.05	37.87^{a}±2.03
6	396.42^{b}±15.27	54.04^{a}±2.81	59.73^{a}±3.14	63.22^{a}±2.73	53.51^{a}±2.64
7	209.78^{b}±20.51	63.24^{a}±3.69	55.73^{a}±3.08	62.58^{a}±3.19	61.47^{a}±3.10
8	280.49^{b}±16.91	73.6^{a}±3.48	70.33^{a}±3.44	79.73^{a}±2.54	74.47^{a}±2.94

Values are means ± standard error; Means values with different superscript in a row differ significantly (P<0.05)

Table 3. Weekly feed intake (g/bird) of broilers during different growth periods under different experimental feed regime

Age (weeks)	Treatment				
	T_0	T_1	T_2	T_3	T_4
1	104^{d}±0.43	48.87^{a}±0.95	48.43^{a}±0.52	57.77^{c}±0.48	53.1^{b}±0.86
2	228.67^{c}±1.26	93^{a}±1.60	93^{a}±0.86	108.33^{b}±0.50	108.67^{b}±1.26
3	381.67^{d}±0.92	217.33^{a}±1.72	228.67^{b}±1.26	259^{c}±0.69	257.33^{c}±0.92
4	428.33^{d}±0.50	246.33^{a}±0.80	253^{b}±0.86	266.33^{c}±0.80	268.67^{c}±1.26
5	477.67^{e}±0.50	266.33^{a}±0.80	275.33^{b}±0.50	286.33^{c}±0.80	284^{d}±1.25
6	482^{e}±1.25	299.67^{a}±0.80	313^{b}±0.86	322^{c}±0.43	328.33^{d}±0.50
7	579.67^{d}±0.80	373^{a}±0.86	386.33^{b}±0.80	399.67^{c}±0.80	397.33^{c}±0.92
8	604^{e}±1.25	379.67^{a}±0.80	388.33^{b}±0.50	398.67^{c}±0.99	393^{d}±0.86

Values are means ± standard error; Means values with different superscript in a row differ significantly (P<0.05)

reared in deep litter registered 68.13% dressing yield by Doley *et al.* (2009) which is higher than recorded in the present study in comparison of Kadaknath birds.

Contradictory to the present study, Ilavarasan *et al.* (2016) reported lower moisture, protein, fat and ash in desi chicken of Tamilnadu, whereas higher fat was observed by Pambuwa and Tanganyika (2017).

CONCLUSION

From the results of the present investigation, it can be concluded that feed efficiency, body weight, weight gain, dressing percentage, eviscerated weight percentage, drawn percentage and meat-bone ratio found better in commercial strain in comparison to Kadaknath. Although, the protein, fat and cholesterol content were found

Table 4. Mean cumulative FCR of broilers during different growth periods under different experimental feed regime

Age (days)	Treatments				
	T_0	T_1	T_2	T_3	T_4
0-7	1.75^{a}±0.05	5.5^{b} ±1.10	4.5^{b}±0.15	4.6^{b}±0.12	4.4^{b}±0.13
0-14	1.6^{a}±0.04	3.9^{b}±0.16	4.2^{b}±0.15	4.7^{c}±0.14	4.8^{c}±0.13
0-21	1.56^{a}±0.04	4.2^{b}±0.11	4.8^{cd}±0.12	5.0^{d}±0.11	4.6^{c}±0.16
0-28	1.6^{a}±0.04	4.5^{b}±0.11	4.9^{c}±0.10	5.2^{c}±0.14	4.9^{c}±0.12
0-35	1.7^{a}±0.03	4.6^{b}±0.09	5.2^{c}±0.10	5.1^{c}±0.10	5.2^{c}±0.08
0-42	1.54^{a}±0.02	4.7^{b}±0.09	5.1^{c}±0.1	5.1^{c}±0.10	5.1^{c}±0.09
0-49	1.7^{a}±0.03	4.9^{b}±0.09	5.2^{c}±0.11	5.2^{c}±0.1	5.3^{c}±0.09
0-56	1.8^{a}±0.02	4.8^{b}±0.08	5.1^{c}±0.11	5.0^{c}±0.11	5.2^{c}±0.11

Values are means ± standard error; Means values with different superscript in a row differ significantly (P<0.05)

Table 5. Mean proximate compositions of broiler meat (Leg and Breast) under different experimental feed regime

Portion	Parameter %	Treatment				
		T_0	T_1	T_2	T_3	T_4
Leg	Moisture	69.1^{a}±0.61	68.9^{a}±0.98	68.57^{a}±0.62	67.67^{a}±0.88	69.3^{a}±0.32
	Ash	1.26^{b}±0.04	0.38^{a}±0.05	0.34^{a}±0.03	0.31^{a}±0.03	0.31^{a}±0.01
	Fat	6.73^{b}±0.04	2.07^{a}±0.04	1.99^{a}±0.12	1.98^{a}±0.06	1.82^{a}±0.35
	Protein	16.33^{a}±0.26	20.87^{c}±0.28	19.97^{bc}±0.27	19.47^{b}±0.32	19.51^{b}±0.35
Breast	Moisture	69.13^{a}±1.09	68.77^{a}±0.72	68.9^{a}±0.25	69.23^{a}±0.44	69.43^{a}±0.37
	Ash	1.74^{c}±0.03	0.39^{b}±0.01	0.34^{ab}±0.02	0.31^{a}±0.03	0.31^{a}±0.02
	Fat	1.28^{b}±0.02	1^{a}±0.07	0.99^{a}±0.06	0.96^{a}±0.04	1.02^{a}±0.04
	Protein	19.53^{a}±0.19	24.87^{c}±0.28	24.03^{b}±0.33	24.23^{bc}±0.20	24.1b^{c}±0.17

Values are means ± standard error; Means values with different superscript in a row differ significantly (P<0.05)

significantly better in the case of Kadaknath birds as compared to commercial strain.

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