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Performance of Commercial Broilers under Separate Sex Rearing and Feeding during the Finisher Period

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The performance of commercial broiler chicken was evaluated under separate sex rearing and feeding during the finisher stage (22-42 days age). A total of 210, (21 days-old) commercial broilers were randomly allocated to five groups, viz., A (male & female mixed), B (male), C (male), D (female), and E (female) containing 42 birds in each group. The birds from groups A, C, and E were fed with a commercial broiler finisher diet containing 3250 kcal ME/kg, 19.5% CP, 1.00% Dig. Lysine (Dig. Lys) and 0.49% Dig. Methionine (Dig, Met). The males in group B were fed a special male diet containing 3000 kcal ME/kg, 18% Crude Protein (CP), and females from group D were fed a special female diet containing 3100 kcal ME/kg, 19.5 % CP. The Dig. Lys and Dig. Met levels

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in group B and D finisher diets were 2% higher than in group A. The results of the study concluded that the separate sex rearing of broilers may be followed by feeding special finisher diets to males (B) and females (D) to achieve similar body weight, weight gain, and feed efficiency to that of males (C) and females fed with a commercial finisher diet. Separate sex rearing of commercial broilers with special feeding is more economical than commercial diets fed to mixed and separate sex. Females fed on a special finisher diet had significantly ($P < .05$) higher serum total protein, albumin, and A/G ratio than males fed on a special finisher diet.

Keywords: Broiler chicken; sex separate feeding; special diet.

1. INTRODUCTION

Commercial broilers are fast-growing meat birds that quickly achieve higher body weight with better feed efficiency. Broiler feed accounts for 70-75% of production costs in the poultry industry. Mixed-sex (straight-run) rearing of broilers has many implications in terms of feeding, welfare, and management aspects as compared to rearing in separate sexes. The sexual differences between the birds have greatly affected the physiological and nutrient requirements [1,2]. The male broiler has been known and accepted to be consistently superior to the female in terms of growth [3,4] The growth rate in males is higher than in females because of testosterone hormone, and their amino acid (AA) requirements for potential growth would be expected to be higher [5]. Males and females on the same feed formulation would be a compromise between what is required by each sex. The interest in digestible AA formulation arises from advantages of feeding chickens less dietary protein to support the desired performance [6]. Male and female broilers have different crude protein (CP) requirements [7], and the maximum advantage of separate-sex feeding might be achieved with a high or a low-protein feed [5]. The broilers fed low CP levels with optimum essential AA improved growth performance compared to the diets with high levels of CP during pre-starter and starter phases [8]. Feeding higher levels of a limiting AA or protein increases growth uniformity in broilers [9]. The growth rate in females is less with higher fat deposition than in males. Meat from females showed a significantly higher ($p < .05$) protein, dry matter, fiber diameter, and shear force during separate sex rearing [10]. The limiting AA like lysine (Lys) and methionine (Met) supplementation of low-CP diets helps to reduce fat retention, nitrogen excretion and improve nitrogen retention efficiency in broilers [11]. Different dietary regime and sex also influenced various haemato biochemical parameters [12-15-17]. By considering the benefits of sex separate rearing, an attempt was made to check the growth performance and cost-effectiveness of separate sex rearing by use of high energy and protein in females and low energy and protein in males along with Lys and Met in both male and female special diets.

2. MATERIALS AND METHODS

The performance of commercial broiler chicken was evaluated under separate sex rearing and feeding during the finisher stage (22-42 days of age). On arrival, 210 day-old chicks were reared under standard management conditions in a deep litter housing system and fed with commercial broiler pre-starter and starter diets from 0-10 and 11-21 days of age. All the chicks were uniformly brooded under a single brooding area for 10 days. On the 21st day of age, the sexes were separated by observing the early appearance of the comb in males. The birds were randomly assigned in a completely randomized design to five groups, viz., A (Male & female mixed), B (Male), C (Male), D (Female), and E (Female), containing 42 birds in each group. Each treatment had three replicates with 14 chicks each. The birds from groups A, C, and E were fed a commercial broiler finisher diet, while birds from groups B and D were fed a special male and female finisher diet, respectively. The dietary regime details for mixed sex and separate male and female sexes during the finisher phase (22-42 days) are illustrated in Table 1. The ingredient composition and chemical composition of different experimental diets is given Table 2.

2.1 Performance Traits

Body Weight and Weight Gain: The broiler birds were weighed individually from each replicate at weekly intervals from third to sixth week of age to obtain average weekly body weight and weight gain per bird for various treatments.

Table 1. Nutrient density of male and female diets in finisher ration fed from 22-42 days of age

Groups	Sex	Diet (22-42 d)	ME Kcal/kg	CP %	Dig. Lys %	Dig. Met %
A	Mixed	Commercial broiler finisher diet	3250	19.5	1.00	0.49
B	Male	Broiler male finisher diet	3000	18.00	2% Higher than group A	2% Higher than group A
C	Male	Commercial broiler finisher diet	3250	19.5	1.00	0.49
D	Female	Broiler female finisher diet	3100	19.5	2% Higher than group A	2% Higher than group A
E	Female	Commercial broiler finisher diet	3250	19.5	1.00	0.49

Dig. Lys: Digestible Lysine, Dig. Met: Digestible Methionine

Table 2. Percent ingredient composition and chemical composition of different experimental diets

Percent ingredients	Groups				
	A (Mixed)	B (Male)	C (Male)	D (Female)	E (Female)
Maize	66.060	72.180	66.060	67.530	66.060
SBM 45%	20.430	22.000	20.430	22.000	20.430
Maize gluten meal	6.700	2.400	6.700	5.600	6.700
Oil	3.500	0.000	3.500	1.550	3.500
Lime Stone Powder (LSP)	1.000	1.000	1.000	1.000	1.000
Di-Calcium Phosphate (DCP)	0.800	0.800	0.800	0.800	0.800
Trace Minerals	0.100	0.100	0.100	0.100	0.100
Vitamin Mixture	0.050	0.050	0.050	0.050	0.050
Salt	0.300	0.300	0.300	0.300	0.300
Soda bi carb	0.100	0.100	0.100	0.100	0.100
L – Lysine	0.360	0.370	0.360	0.350	0.360
L-Threonine	0.050	0.090	0.050	0.050	0.050
DL-Methionine	0.160	0.220	0.160	0.180	0.160
Antioxidant	0.013	0.013	0.013	0.013	0.013
Choline Cl (60%)	0.100	0.100	0.100	0.100	0.100
Liver Tonic	0.050	0.050	0.050	0.050	0.050
Toxin Binder	0.050	0.050	0.050	0.050	0.050
Phytase5000	0.010	0.010	0.010	0.010	0.010
NSP Zyme 200/Protease	0.010	0.010	0.010	0.010	0.010
Betain	0.050	0.050	0.050	0.050	0.050
Maduramycin	0.050	0.050	0.050	0.050	0.050
Carrier (LSP)	0.057	0.057	0.057	0.057	0.057
Total	100.00	100.00	100.00	100.00	100.00
Chemical composition (calculated values)					
ME (kcal/kg)	3232.92	3001.16	3232.92	3105.71	3232.92
Crude Protein (CP) (%)	19.29	18.01	19.29	19.47	19.29
Crude Fat (%)	2.94	3.11	2.94	2.99	2.94
Crude Fibre (%)	2.55	2.77	2.55	2.68	2.55
AIA (%)	1.49	1.55	1.49	1.53	1.49
Calcium (%)	0.66	0.67	0.66	0.67	0.66
Phos (%)	0.39	0.38	0.39	0.39	0.39
Dig. Lys (%)	1.00	1.02	1.00	1.02	1.00
Dig. Met (%)	0.49	0.50	0.49	0.50	0.49
Dig Cyst (%)	0.26	0.24	0.26	0.26	0.26

Percent ingredients	Groups				
	A (Mixed)	B (Male)	C (Male)	D (Female)	E (Female)
Dig. Meth+ Cyst (%)	0.74	0.74	0.74	0.76	0.74
Dig. Thr (%)	0.66	0.66	0.66	0.67	0.66
Dig. Typ (%)	0.17	0.17	0.17	0.18	0.17
Dig. Arg (%)	0.99	0.99	0.99	1.02	0.99
Dig Val (%)	0.80	0.75	0.80	0.81	0.80
Choline	960.70	1040.78	960.70	1012.88	960.70

Dig Cyst: Digestible Cystine, Dig. Thr: Digestible Threonine, Dig. Typ: Digestible Tryptophan, Dig. Arg: Digestible Arginine, Dig. Val : Digestible Valine

Feed Consumption: The weighed quantity of feed was offered daily replicate-wise to broiler birds, and left-over feed was recorded daily to obtain the average weekly feed intake per bird from the third to sixth week of age.

Feed Efficiency: The weekly feed efficiency was calculated replicate-wise based on body weight or weight gain and feed intake.

Economics: The cost of feed per kg live weight for different dietary treatments was calculated on the basis of body weight attained. The net profit per kg live broiler birds was taken for different groups by considering live body weight and recurring expenditure.

2.2 Hemato-Biochemical Parameters

At the time of slaughter on the 42nd day of age, jugular vein blood from two birds from each replicate was collected in a clean sterilized vial with EDTA as an anticoagulant to estimate total erythrocytes count (TEC). To estimate total protein (TP) and albumin (A), the blood samples of two birds from each replicate were collected in sterile, dry, labelled glass tubes and kept in a slanted position at room temperature to facilitate serum separation. The TP and A from separated serum were estimated calorimetrically using the biuret method, utilizing available kits in the market. The serum globulin (G) levels were calculated mathematically by subtracting serum A from Serum TP. The serum Albumin: Globulin ratio (A/G) was estimated using serum albumin and globulin values.

2.3 Statistical Analysis

The data was analyzed by one-way ANOVA with the help of IBM SPSS Software-20. The Duncan Multiple Range Test (DMRT) post-hoc analysis was done to test the significant mean differences between the groups with significance levels defined at $P < .05$ [18].

3. RESULTS AND DISCUSSION

3.1 Body Weight and Weight Gain

The body weight of broilers (Table 3) at the end of third week of age did not differ considerably among different groups. The separate sex feeding and rearing of broilers during the finisher stage (4-6 weeks) had a significant ($P < .05$) effect on fifth and sixth week body weight. In the fourth week, body weight did not differ considerably. Males were heavier than females during the fifth and sixth weeks. The growth rate in males is greater than in females because of the testosterone hormone in males. Therefore, with low-density diet males may give cost effective production without compromising body weight. Report to the female broilers, the males had a higher final body weight ($P < .05$) [10]. The sex-separated broilers showed the highest uniformity compared to the mixed flock [19]. Throughout the birds' life cycles, differences in growth rate, feed intake, and feed efficiency are also observed between males and females [20].

Comparable body weights of males at 4th, 5^{th,} and 6th weeks of age between groups B and C indicated that males can be fed separately with a special diet containing 250 kcal less ME/kg diet (3000 ME/kg), 1.5% less CP (18.00%) with 2% higher Dig. Lys. (1.02%) and Met. (0.50%) than commercial diet (3250 kcal ME/kg, 19.50% CP and 1% Dig; Lys. and 0.49% Met) during the finisher stage. Comparable body weights of females at 4th, 5^{th,} and 6th weeks of age from groups D and E indicated that females can be fed separately with a special diet containing 150 kcal less ME/kg (3100 kcal/kg) with 2% higher Dig. Lys. (1.02%) and Met. (0.50%) than commercial diet (3250 kcal ME/kg, 19.50% CP and 1% Dig; Lys. and 0.49% Met) during the finisher stage. Comparable body weight at 4th, 5^{th,} and 6th weeks of age among groups B and D indicated that the females can achieve similar body weight to that of males when female

broilers fed with a special diet containing 100 kcal higher ME /kg and 1.5% higher CP (3100 kcal/kg ME & 19.5%) than special male diet (3000 ME/kg, 18.00% CP) with similar 2% higher Dig. Lys. (1.02%) and Met. (0.50%) during the finisher stage.

A similar trend was observed in weight gain (Table 4) by sex-separate rearing and feeding during the finisher stage of 4-6 weeks of age [20]. Reducing the energy level from 3,200 to 3,000 kcal/kg in broiler chickens from 21 to 42 days of age did not have any adverse effects on the average daily gain [21]. A slight effect of the rearing system in males in terms of weight gain at 35 days of age in straight run chickens reported by earlier worker [22]. On the other hand, the straight-run female showed lower weight gain at 35 and 49 days of age ($P < .05$). Present study may conclude that using special diets during sex-separate rearing in commercial broilers is beneficial.

The study's overall results indicated that sex-separate broiler rearing with sex-separate feeding influenced body weight and weight gain during the finisher stage. The results also indicated that male and female special diets should contain 2% higher Dig. Lys. (1.02%) and Dig. Met (0.50%) than commercial diet (Dig. Lys. 1.00% and Dig. Met 0.49%). It was beneficial to use a special male diet containing 3000 ME/kg, 18.00% CP, and a special female diet containing 3100 kcal ME/kg and 19.5% CP with 1.02% Dig. Lys and 0.50% Dig. Met in both diets than the commercial broiler diet (3250 kcal ME/kg, 19.50% CP and 1% Dig; Lys. and 0.49% Met) during the finisher stage.

3.2 Feed Consumption

The feed consumption of broilers (Table 5) during 0-3 weeks before the experiment period did not vary considerably among different groups. The separate sex feeding and rearing of broilers during the finisher stage (4-6 weeks) significantly ($p < .05$) affected feed consumption. The feed consumption of male broilers fed with a special diet (B) was compared with a commercial diet (C), while the feed consumption of female broilers fed with a special diet (D) was comparable with a commercial diet (E). Females (D & E) consumed significantly ($P < .05$) less feed than males (B & C) during the finisher stage. Separately reared and specially fed female broilers attained comparable body weights with less feed intake and better efficiency than males reared separately and fed with a special diet [23]. Male broilers are estimated to have higher AA requirements than females [24]. The male broiler diets require 10% higher Dig Lys. for optimum performance [25-27]. Maynard et al [28] studied the assessment of limiting dietary amino acids in male broiler chickens offered reduced crude protein diets and observed that supplementation of limiting AA in male broiler diet had higher body weight and improved feed conversion ratio compared to a diet devoid of limiting AA. Pokoo-Aikins et al [29] reported that supplemental methionine contributes to body weight gain and helps with metabolism and in synthesizing the proteins that contribute to muscle, organ, and feather formation, all of which contribute to body weight. The age, sex, and strain may influence the digestibility of feedstuffs [30].

Statistically comparable feed consumption of males from groups B and C indicated that males can be fed separately with a special diet containing 250 kcal less ME/kg diet (3000 ME/kg), 1.5% less CP (18.00%) with 2% higher Dig. Lys. (1.02%) and Met. (0.50%) than commercial diet (3250 kcal ME/kg, 19.50% CP and 1% Dig; Lys. and 0.49% Met) during the finisher stage. Reducing the energy level from 3,200 to 3,000 kcal/kg in broiler chickens from 21 to 42 days of age had no adverse effects on feed intake [21]. A slight effect of the rearing system in males in terms of feed intake per kg at 35 days of age, and the female bird showed higher feed intake per kg body weight at 49 days was reported by earlier worker [22]. The straight-run-rearing males had positive effects on performance and coefficient of variation, whereas straight-run-rearing females had adverse effects [31]. This difference may be attributed to competition for feeding space [31].

Statistically comparable feed consumption of females from groups D and E indicated that females can be fed separately with a special diet containing 150 kcal less ME/kg (3100 kcal/kg) with 2% higher Dig. Lys. (1.02%) and Met. (0.50%) than commercial diet (3250 kcal ME/kg, 19.50% CP and 1% Dig; Lys. and 0.49% Met) during the finisher stage.

3.3 Feed Efficiency

Feed efficiency (Table 6) of broilers during 0-3 weeks of age was comparable. The separate sex feeding and rearing of broilers during the finisher stage (4-6 weeks) did not differ considerably.

The feed efficiency of broilers during an overall period of 0-6 weeks also did not differ significantly. It was beneficial to use a special male diet containing 250 kcal less ME/kg diet (3000 ME/kg), 1.5% less CP (18.00%), and a special female diet containing 150 kcal less ME/kg (3100 kcal/kg) with the addition of 2% higher Dig. Lys. (1.02%) and Met. (0.50%) in both the diets than the commercial diet (3250 kcal ME/kg, 19.50% CP and 1% Dig; Lys. and 0.49% Met) during the finisher stage to achieve similar feed efficiency.

The nutrient requirement of male and female broilers differs during the finisher phase of 4-6 weeks. Male and female broilers require 1.02% Dig. Lys and 0.50% Dig Met. during their finisher stage. Based on growth performance, Dig. Lys requirements for modern broilers are higher than previously reported [32]. Males may require 1.5% less CP (*i.e.,* 18%) than females (*i.e.* 19.5%). The females were heavier when diets of higher protein content were offered (P < .05) [23]. Diet protein did not affect the body weight of male birds at 42 d (P > .05). It concludes that male birds can be reared on low-protein diets without losing weight. Female broilers are heavier when diet protein intake is increased through diets with higher protein content. The male broiler diets require 10% higher Dig Lys. for optimum performance [25-27]. Females may require 100 kcal higher ME/kg diet (*i.e.* 3100 kcal/kg) than male (*i.e.* 3000 kcal/kg) during the finisher stage. Moreover, 250 kcal ME/kg and 1.5% CP for males and 150 kcal ME/kg for females may be reduced in a commercial diet (3250 kcal ME/kg, 19.5% CP) during finisher stage. The sex affects feed:gain ratio of broiler chicken [20].

Table 3. Body weight of broilers under separate sex rearing and feeding

Groups	Age in Weeks			
	3	**4**	**5**	**6**
A	617.98±32.45	1143.41±20.03	1589.81^{a}±34.50	2090.55^{a}±58.79
B	708.24±43.50	1150.34±10.10	1657.56^{ab}±16.74	2169.27^{ab}±25.20
C	666.94±44.82	1181.07±18.71	1692.23^{b}±39.14	2285.44^{b}±30.38
D	749.63±48.48	1152.64±24.27	1583.85^{a}±22.96	2047.38^{a}±59.42
E	719.09±56.33	1144.62±17.05	1586.59^{a}±16.94	2083.23^{a}±40.39
SEM	19.575	7.495	15.633	29.050
P value	0.251	0.556	0.050	0.036

Means bearing different superscripts within a column differ significantly (P < .05)

Table 4. Body weight gain of broilers under separate sex rearing and feeding

Groups	Age in Weeks		
	0-3	**4-6**	**0-6**
A	572.22±32.11	1472.57^{ab}±30.11	2044.79^{a}±58.48
B	663.09±43.57	1461.04^{ab}±54.67	2124.13^{ab}±25.32
C	621.55±44.98	1618.49^{b}±69.88	2240.04^{b}±30.32
D	704.54±38.39	1297.75^{a}±70.44	2002.28^{a}±69.42
E	674.67±56.06	1364.14^{a}±69.60	2038.81^{a}±40.12
SEM	19.606	37.127	28.997
P value	0.244	0.035	0.036

Means bearing different superscripts within a column differ significantly (P < .05)

Table 5. Feed consumption of broilers under separate sex rearing and feeding

Groups	Age in Weeks		
	0-3	**4-6**	**0-6**
A	792.55±25.86	2390.19^{ab}±104.23	3182.74±129.99
B	859.04±28.87	2709.25^{b}±24.40	3568.29±52.38
C	854.62±48.34	2716.47^{b}±90.66	3571.10±109.17
D	943.51±7.42	2224.30^{a}±178.05	3167.81±181.17
E	908.10±61.83	2416.36^{ab}±100.45	3324.47±128.92
SEM	20.225	66.363	67.564
P value	0.150	0.040	0.116

Means bearing different superscripts within a column differ significantly (p<0.05)

Table 6. Feed efficiency of broilers under separate sex rearing and feeding

Groups	Age in Weeks		
	0-3	**4-6**	**0-6**
A	1.39±0.035	1.62±0.04	1.56±0.02
B	1.30±0.04	1.86±0.08	1.68±0.03
C	1.38±0.03	1.68±0.09	1.59±0.05
D	1.34±0.005	1.71±0.08	1.58±0.05
E	1.35±0.02	1.77±0.08	1.63±0.04
SEM	0.014	0.037	0.019
P value	0.347	0.337	0.343

Table 7. Economics of broiler production under separate sex rearing and feeding

Particular	Groups				
	A	**B**	**C**	**D**	**E**
	Mixed Sex	**Male Sex**	**Male Sex**	**Female Sex**	**Female Sex**
	CD	**SD**	**CD**	**SD**	**CD**
Chick cost (A)	45	45	45	45	45
Feed consumption/bird					
0-3 wk	0.793	0.859	0.855	0.944	0.908
Rate/kg (Rs)	38.29	38.29	38.29	38.29	38.29
Feed cost (a)	30.35	32.89	32.72	36.13	34.77
4-6 wk	2.390	2.709	2.716	2.224	2.416
Rate/kg (Rs)	40.63	35.06	40.63	38.10	40.63
Finisher Feed cost difference		5.57		2.53	
% reduction in feed cost than commercial diet		13.7%		6.23%	
Feed cost (b) (Rs)	97.113	94.986	110.370	84.746	98.177
Total Feed cost (B) (Rs)	127.46	127.88	143.09	120.87	132.95
Saving of FC/bird (Rs)		15.215		12.075	
Miscellaneous	10.00	10.00	10.00	10.00	10.00
Total cost/bird (A+B+C)	182.46	182.88	198.09	175.87	187.95
BW	2.091	2.169	2.240	2.047	2.083
Rate/kg live	88	88	88	88	88
Income from sale (D)	183.97	190.90	197.12	180.17	183.32
Gross Profit E=D-(A+B+C)	*1.51*	*8.02*	*-0.97*	*4.30*	*-4.62*
Net profit/kg live	0.72	3.70	-0.43	2.10	-2.22
Extra amount		4.13		4.32	

CD: Commercial Diet, SD: Special Diet

Table 8. Effect of special male and female finisher diet on hemato-biochemical parameters during sex-separate rearing

Groups	TEC (x10^6/cumm)	TP (g%)	A (g%)	G (g%)	A/G ratio
A	2.89±0.74	4.16^{b}±0.04	2.05^{b}±0.05	2.10^{b}±0.07	0.99^{a}±0.06
B	3.20±0.64	4.14^{b}±0.05	2.41^{c}±0.11	1.73^{a}±0.12	1.47^{b}±0.20
C	3.60±0.63	4.54^{c}±0.08	2.75^{d}±0.03	1.78^{a}±0.07	1.56^{b}±0.07
D	2.96±0.33	3.71^{a}±0.04	1.76^{a}±0.06	1.94^{ab}±0.08	0.92^{a}±0.07
SEM	0.29	0.06	0.08	0.05	0.08
P value	0.84	0.00	0.00	0.05	0.02

Means bearing different superscripts within a column differ significantly (p< .05)

3.4 Economics

The economics calculated at the end of the experiment is illustrated in Table 7. The requirement of 250 kcal less ME/kg diet (3000 ME/kg), 1.5% less CP (18.00%) with 2% higher Dig. Lys. (1.02%) and Met. (0.50%). In special male diets, feed cost was decreased by Rs 5.57/kg (13.7% reduction in feed cost) compared to the commercial diet, and the reduction of 150 kcal was less than the ME/kg diet, with 2% higher Dig. Lys. (1.02%) and Met. (0.50%) in the female special diet decreased feed cost by Rs 2.53/kg (6.23% reduction in feed cost) compared to the commercial diet. Rearing males and females separately with special finisher diet feeding earned Rs 4.13 and Rs 4.32 per kg live weight than commercial diet feeding. The most significant economic return [33] for separate male and female broilers using dietary low protein and energy, corroborated with the present findings. Results of the present study indicated that separate sex feeding and rearing is more economical than a commercial diet fed to mixed and separate sex. The modern broiler strains recorded substantial gains, especially among female broilers, when reared sex separately [9]. The advantages were, as expected, better uniformity, faster growth among the females, and more significant income. The separate sex rearing enables feeding each sex according to its optimum economic requirements [5]. Research indicates that reduced protein content has no effect on body mass and consumption of feed by broilers, but the effect on the economic efficiency of fattening is significant [34].

3.5 Haemato-Biochemical Findings

The haematological parameter (TEC) and biochemical parameters **(**serum TP, A, G and A/G ratio) are described in Table 8. Though TEC was non-significant, it was apparently increasing in females fed with a special finisher diet (C) than in males (A). Females fed with a special finisher diet (C) had significantly ($P < .05$) higher serum TP, A, and A/G ratio than males (group A). Higher serum TP and lower G values were observed in more efficient birds due to superior utilization of nutritional protein indicating that the special feeding to females improved protein efficiency in the present study. The blood biochemical parameters increased significantly with age and were affected by the sex of the chickens [35]. These changes are supposed to reflect physiological changes in their metabolism. The study results indicated that the special diet feeding under separate sex rearing affects the haemato-biochemical parameters in commercial broilers. Female broilers fed on a special finisher diet containing 150 less ME/kg feed (3100 kcal/kg) and 2% higher Dig. Lys. (1.02%) and Met. (0.50%) had improved haemato-biochemical parameters.

4. CONCLUSION

In conclusion, the separate sex rearing of broilers may be followed by feeding males with a diet containing 3000 kcal ME/kg, 18% CP and 2% higher Dig. Lys. (1.02%) and Met. (0.50%); and females with 3100 kcal ME/kg, 19.5% CP and 2% higher Dig. Lys. (1.02%) and Met. (0.50%) to achieve similar body weight, weight gain and feed efficiency to that of males and females fed with a commercial diet (3250 kcal ME/kg, 19.50% CP and 1% Dig; Lys. and 0.49% Met). Moreover, separate sex feeding and rearing are more economical than commercial diets fed to mixed and separate sex. Females fed on a special finisher diet had significantly ($P < .05$) higher serum TP, A, and A/G ratio than males fed on a special finisher diet.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

ETHICAL APPROVAL

The research was approved by the Institutional Animal Ethics Committee (IAEC) [Protocol No IAEC12/23/KNPCVS/2024].

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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